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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION MULTIYEAR AUTHORIZATION ACT OF 1989

AUGUST 31, 1989.—Committed to the Committee of the Whole House on the State of the Union and ordered to be printed

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Mr. ROE, from the Committee on Science, Space, and Technology, submitted the following

1008-C)
1008-D

REPORT

[To accompany H.R. 1759]

Y1.1/8:101-226.

[Including cost estimate of the Congressional Budget Office]

The Committee on Science, Space, and Technology, to whom was referred the bill (H.R. 1759) to authorize appropriations to the National Aeronautics and Space Administration for research and development, space flight, control and data communications, construction of facilities, and research and program management, and for other purposes, having considered the same, report favorably thereon with an amendment and recommend that the bill as amended do pass.

The amendment strikes out all after the enacting clause of the bill and inserts a new text which appears in italic type in the reported bill.

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19-795

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Strike all after the enacting clause and insert in lieu thereof the following:

SECTION 1. SHORT TITLE.

This Act may be cited as the "National Aeronautics and Space Administration Multiyear Authorization Act of 1989".

SEC. 2. FINDINGS.

The Congress finds that—

(1) the United States aeronautics and space program is supported by an overwhelming majority of the American people;

(2) the United States aeronautics and space program genuinely reflects our Nation's pioneer heritage and demonstrates our quest for leadership, economic growth, and human understanding;

(3) the United States space program is based on a solid record of achievement and continues to promote the objective of international cooperation in the exploration of the universe;

(4) the United States aeronautics and space program generates critical technology breakthroughs that benefit our economy and significantly improve our standard of living;

(5) the United States aeronautics and space program excites the imagination of every generation and can stimulate the youth of our Nation toward the pursuit of excellence in the fields of science and mathematics;

(6) the United States aeronautics and space program contributes to the Nation's technological competitive advantage;

(7) the United States aeronautics and space program requires a sustained commitment of financial and human resources;

(8) the United States space transportation system will depend upon a robust fleet of Space Shuttle Orbiters and expendable launch vehicle services;

(9) the United States space program will be advanced with the deployment of a permanently manned space station with research, observation, servicing, manufacturing, and staging capabilities;

(10) the United States aeronautics program has been a key factor in maintaining preeminence in aviation over many decades;

(11) the United States needs to maintain a strong program with respect to transatmospheric research and technology; and

(12) the National Aeronautics and Space Administration is primarily responsible for formulating and implementing the civil aeronautics and space program in the United States.

SEC. 3. POLICY.

It is declared to be national policy that the United States should—

(1) rededicate itself to the goal of leadership in critical areas of space science, space exploration, and space commercialization;

(2) increase its commitment of budgetary resources for the space program to reverse the dramatic decline in real spending for such program since the achievements of the Apollo program;

(3) forge a robust national space program that maintains a healthy balance between manned and unmanned space activities and recognizes the mutually reinforcing benefits of both;

(4) maintain an active fleet of space shuttle orbiters, including an adequate provision of structural spare parts, and evolve the Orbiter design to improve safety and performance, and reduce operational costs;

(5) sustain a mixed fleet by utilizing commercial expendable launch vehicle services;

(6) continue with the development and deployment of a permanently manned space station;

(7) establish a dual capability for logistics and resupply of the space station utilizing the space shuttle and expendable launch vehicles, including commercial services if available;

(8) continue to seek opportunities for international cooperation in space;

(9) maintain an aggressive program of aeronautical research and technology development designed to enhance the United States preeminence in civil and

military aviation and improve safety and efficiency of the United States air transportation system; and

(10) conduct a program of technology maturation and flight demonstration to prove the feasibility of the air-breathing, hypersonic aero-space plane capable of single-stage-to-orbit operation and hypersonic cruise in the atmosphere.

SEC. 4. AUTHORIZATION OF APPROPRIATIONS.

There are hereby authorized to be appropriated to the National Aeronautics and Space Administration for fiscal year 1990, except as otherwise provided:

(1) For "research and development", for the following programs:

(A) ~~United States~~ International Space Station Freedom—

(i) of the amounts authorized to be appropriated for the Space Station for fiscal year 1990 by section 201(a)(1)(A) of the National Aeronautics and Space Administration Authorization Act, Fiscal Year 1989, not more than $15,000,000 shall be made available for the Flight Telerobotic Servicer program, and not more than $3,700,000 shall be made available for the Space Station Docking Module program; and

(ii) $3,494,400,000 for fiscal year 1992.

(B) Space transportation capability development, $651,500,000, along with $716,000,000 for fiscal year 1991 and $676,000,000 for fiscal year 1992.

(C) Physics and astronomy, $914,500,000, along with $1,013,000,000 for fiscal year 1991 and $1,147,000,000 for fiscal year 1992.

(D) Life sciences, $124,200,000, along with $154,000,000 for fiscal year 1991 and $151,000,000 for fiscal year 1992.

(E) Planetary exploration, $361,900,000, along with $322,000,000 for fiscal year 1991 and $278,000,000 for fiscal year 1992.

(F) Space applications, $646,000,000, along with $552,000,000 for fiscal year 1991 and $518,000,000 for fiscal year 1992, including not more than $2,000,000 for each such fiscal year for experimenter ground stations for the Advanced Communications Technology Satellite, but only if the experimenter receiving funds obtains at least an equal amount of funds from sources other than the National Aeronautics and Space Administration as is received under this subparagraph.

(G) Technology utilization, $22,700,000, along with $23,400,000 for fiscal year 1991 and $21,200,000 for fiscal year 1992.

(H) Commercial use of space, $40,300,000, along with $59,700,000 for fiscal year 1991 and $92,450,000 for fiscal year 1992.

(I) Aeronautical research and technology, and transatmospheric research and technology, $589,800,000, along with $621,000,000 for fiscal year 1991 and $603,000,000 for fiscal year 1992. None of the funds authorized under this subparagraph for fiscal year 1990 shall be expended unless at least $127,000,000 are made available for such fiscal year for the National Aero-Space Plane Program.

(J) Space research and technology, $358,100,000, along with $487,000,000 for fiscal year 1991 and $530,000,000 for fiscal year 1992.

(K) Space exploration, $20,000,000, along with $35,000,000 for fiscal year 1991 and $100,000,000 for fiscal year 1992.

(L) Safety, reliability, maintainability, and quality assurance, $23,300,000, along with $24,000,000 for fiscal year 1991 and $24,000,000 for fiscal year 1992.

(M) Tracking and data advanced systems, $19,900,000, along with $21,000,000 for fiscal year 1991 and $22,000,000 for fiscal year 1992.

(N) University Space Science and Technology Academic Program, $35,000,000 along with $40,000,000 for fiscal year 1991 and $45,000,000 for fiscal year 1992.

(O) Comet Rendezvous Asteroid Flyby/Cassini mission, not to exceed $1,600,000,000, to remain available until expended, of which—

(i) $490,000,000 shall be available for obligation after October 1, 1989;

(ii) an additional $370,000,000 shall be available for obligation 30 days after the submission of a report summarizing the results of a preliminary design review to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate;

(iii) an additional $640,000,000 shall be available for obligation 30 days after the submission of a report summarizing the results of a critical design review to the Committee on Science, Space, and Technology

of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate; and

(iv) an additional $100,000,000 shall be available for obligation 30 days after the submission of a report summarizing the results of a spacecraft integration and systems test to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate.

(2) For "Space flight, control and data communications", for the following programs:

(A) Shuttle production and operational capability, $1,264,500,000, of which $90,000,000 are authorized only for safety enhancements to the shuttle orbiter, including—

(i) for the space shuttle main engine—

(I) improved design and installation of High Pressure Oxygen Turbopump bearings;

(II) installation of the 2-duct hot gas manifold;

(III) development of enlarged throat diameter;

(IV) development of single-crystal turbine blades; and

(V) general redesign to reduce welds and make welds totally inspectable;

(ii) for the solid rocket booster/solid rocket motor—

(I) implementation of the recommendations contained in the report of the National Research Council entitled "Collected Reports of the Panel on Technical Evaluation of NASA's Redesign of the Space Shuttle Solid Rocket Booster", issued in 1988;

(II) development of a locking feature for the nozzle leak check port plugs;

(III) development of one-piece case stiffener rings;

(IV) development of nonasbestos motor insulation;

(V) enhancement of lightning protection for case and nozzle; and

(VI) modification of aft skirt structure;

(iii) for the external tank—

(I) upgrading of liquid hydrogen and oxygen temperature, pressure, and liquid level sensors;

(II) upgrading of thermal insulation on areas where dislodged insulation can affect the orbiter; and

(III) investigation of corrosion prevention methods to preclude structural problems; and

(iv) for the orbiter—

(I) modification of structure to eliminate negative margins;

(II) upgrading of the auxiliary power units;

(III) development of a redundant nose wheel steering system (including possible extension of the nose wheel strut);

(IV) elimination of Kapton electrical wire insulation; and

(V) upgrading of valves and regulators to preclude leakage of fuels and oxidizers.

By September 30, 1990, the Administrator shall submit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a full report on the completion of the safety enhancements specified in this subparagraph. Additionally, there are authorized to be appropriated $1,303,000,000 for fiscal year 1991 and $1,368,000,000 for fiscal year 1992.

(B) Shuttle operations, $2,500,700,000, along with $2,491,900,000 for fiscal year 1991 and $2,667,900,000 for fiscal year 1992.

(C) Expendable launch vehicles and services, $171,500,000, along with $240,000,000 for fiscal year 1991 and $308,000,000 for fiscal year 1992. Of such funds, $2,000,000 in fiscal year 1990, $26,000,000 in fiscal year 1991, and $66,000,000 in fiscal year 1992 may be used only to purchase expendable launch vehicle services, supporting studies, and spacecraft modification for dual compatibility for the TDRS–G satellite.

(D) Space and ground network, communications and data systems, $1,077,100,000, along with $1,159,000,000 for fiscal year 1991 and $1,228,000,000 for fiscal year 1992.

(3) For "Construction of facilities", including land acquisition, as follows:

(A) Construction of addition for Space Systems Automated Integration and Assembly Facility, Johnson Space Center, $10,500,000.

(B) Construction of addition to Mission Control Center, Johnson Space Center, $17,800,000.

(C) Construction of addition to Simulator/Training Facility, Johnson Space Center, $3,800,000.

(D) Modifications for Expanded Solar Simulation, Johnson Space Center, $2,000,000.

(E) Modifications of Process Technology Facility for Space Station, Marshall Space Flight Center, $4,000,000.

(F) Replace Cooling Towers, Launch Complex 39 Utility Annex, Kennedy Space Center, $4,600,000.

(G) Replace Pad A Chillers and Controls, Launch Complex 39, Kennedy Space Center, $1,200,000.

(H) Replace Roofs, Launch Complex 39, Kennedy Space Center, $11,000,000.

(I) Replace Vehicle Assembly Building Air Handling Units, Kennedy Space Center, $1,800,000.

(J) Upgrade Orbiter Modification and Refurbishment Facility to Orbiter Processing Facility No. 3, Kennedy Space Center, $26,000,000.

(K) Modification of High Pressure Industrial Water System, Stennis Space Center, $2,000,000.

(L) Replacement of High Pressure Gas Storage Vessels, Stennis Space Center, $3,000,000.

(M) Construction of natural resource protection at various locations, $3,800,000.

(N) Refurbish bridges, Merritt Island, Kennedy Space Center, $4,500,000.

(O) Rehabilitation of Spacecraft Assembly and Encapsulation Facility II, Kennedy Space Center, $3,500,000.

(P) Rehabilitation of Central Heating/Cooling Plant, Johnson Space Center, $2,800,000.

(Q) Construction of Data Operations Facility, Goddard Space Flight Center, $12,000,000.

(R) Construction of Quality Assurance and Detector Development Laboratory, Goddard Space Flight Center, $7,500,000.

(S) Modernization of South Utility Systems, Jet Propulsion Laboratory, $5,400,000.

(T) Construction of 40 x 80 Drive Motor Roof, Ames Research Center, $1,000,000.

(U) Modifications to Thermo-Physics Facilities, Ames Research Center, $4,600,000.

(V) Modifications to 14 × 22 Subsonic Wind Tunnel, Langley Research Center, $1,000,000.

(W) Modifications to National Transonic Facility for Productivity, Langley Research Center, $7,600,000.

(X) Modifications to 20-Foot Vertical Spin Tunnel, Langley Research Center, $1,900,000.

(Y) Rehabilitation of Central Air Systems, Lewis Research Center, $2,400,000.

(Z) Rehabilitation of Central Refrigeration Equipment, Lewis Research Center, $7,200,000.

(AA) Rehabilitation of 8 × 6 Supersonic and 9 × 15 Low-Speed Wind Tunnels, Lewis Research Center, $6,800,000.

(BB) Rehabilitation of Hypersonic Tunnel, Plum Brook, $4,100,000.

(CC) Repair and Modernization of the 12-Foot Pressure Wind Tunnel, Ames Research Center, $27,600,000.

(DD) Construction of Automation Sciences Research Facility, Ames Research Center, $10,600,000.

(EE) Construction of Supersonic/Hypersonic Low Disturbance Tunnel, Langley Research Center, $6,900,000.

(FF) Modifications for Seismic Safety, Goldstone, CA, Jet Propulsion Laboratory, $2,600,000.

(GG) Repair of facilities at various locations, not in excess of $750,000 per project, $28,000,000.

(HH) Rehabilitation and modification of facilities at various locations, not in excess of $750,000 per project, $36,000,000.

(II) Minor construction of new facilities and additions to existing facilities at various locations, not in excess of $500,000 per project, $10,000,000.

(JJ) Environmental compliance and restoration, $30,000,000.

(KK) Facility planning and design not otherwise provided for, $26,300,000.

(LL) Construction of Observational Instrument Laboratory, Jet Propulsion Laboratory, $14,000,000.

Notwithstanding subparagraphs (A) through (KK), the total amount appropriated under such paragraphs shall not exceed $317,800,000.

(4) For "Research and program management", $2,032,200,000.

(5) For "Inspector General", $8,795,000, along with $9,000,000 for fiscal year 1991 and $9,000,000 for fiscal year 1992.

(6) Notwithstanding paragraph (9), appropriations authorized pursuant to this Act for "Research and development" and "Space flight, control and data communications" may be used (A) for any items of a capital nature (other than acquisition of land) which may be required at locations other than installations of the National Aeronautics and Space Administration for the performance of research and development contracts, and (B) for grants to nonprofit institutions of higher education, or to nonprofit organizations whose primary purpose is the conduct of scientific research, for purchase or construction of additional research facilities; and title to such facilities shall be vested in the United States unless the Administrator of the National Aeronautics and Space Administration (hereafter in this Act referred to as the "Administrator") determines that the national program of aeronautical and space activities will best be served by vesting title in any such grantee institution or organization. Each such grant shall be made under such conditions as the Administrator shall determine to be required to ensure that the United States will receive therefrom benefit adequate to justify the making of that grant. None of the funds appropriated for "Research and development" and "Space flight, control and data communications" pursuant to this Act may be used in accordance with this paragraph for the construction of any major facility, the estimated cost of which, including collateral equipment, exceeds $500,000, unless the Administrator or the Administrator's designee has notified the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate, of the nature, location, and estimated cost of such facility.

(7) Except as otherwise provided, and to the extent provided in an appropriation Act, (A) any amount appropriated pursuant to this Act for "Research and development", for "Space flight, control and data communications", or for "Construction of facilities" may remain available without fiscal year limitation, and (B) contracts may be entered into under "Research and program management" for maintenance and operation of facilities, and for other services to be provided, during the next fiscal year.

(8) Appropriations made pursuant to paragraph (4) may be used, but not to exceed $35,000 per fiscal year, for scientific consultations or extraordinary expenses upon the approval or authority of the Administrator, and his determination shall be final and conclusive upon the accounting officers of the Government.

(9)(A) Funds appropriated pursuant to paragraphs (1), (2), and (4) may be used for the construction of new facilities and additions to, repair, rehabilitation, or modification of existing facilities, if the cost of each such project, including collateral equipment, does not exceed $100,000.

(B) Funds appropriated pursuant to paragraphs (1) and (2) may be used for unforeseen programmatic facility project needs, if the cost of each such project, including collateral equipment, does not exceed $500,000.

(C) Funds appropriated pursuant to paragraph (4) may be used for repair, rehabilitation, or modification of facilities controlled by the General Services Administration, if the cost of each project, including collateral equipment, does not exceed $500,000.

SEC. 5. ADMINISTRATOR'S REPROGRAMMING AUTHORITY.

Any of the amounts authorized in section 4(3)(A) through (LL)—

(1) in the discretion of the Administrator or the Administrator's designee, may be varied upward 10 percent, or

(2) following a report by the Administrator or the Administrator's designee to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate, on the circumstances of such action, may be varied upward 25 percent, to meet unusual cost variations.

The total amount authorized under section 4(3) for fiscal year 1990 shall not be increased as a result of reprogramming carried out pursuant to this section. The au-

thority to vary amounts under this section shall not include the authority to reduce the amount authorized under section 4(3)(LL).

SEC. 6. SPECIAL REPROGRAMMING AUTHORITY FOR CONSTRUCTION OF FACILITIES.

Where the Administrator determines that new developments or scientific or engineering changes in the national program of aeronautical and space activities have occurred; and that such changes require the use of additional funds for the purposes of construction, expansion, or modification of facilities at any location; and that deferral of such action until the enactment of the next authorization Act would be inconsistent with the interest of the Nation in aeronautical and space activities; the Administrator may transfer not to exceed ½ of 1 percent of the funds appropriated pursuant to section 4(1) and (2) to the "Construction of facilities" appropriation for such purposes. The Administrator may also use up to $10,000,000 of the amounts authorized under section 4(3) (A) through (KK) for such purposes. The funds so made available pursuant to this section may be expended to acquire, construct, convert, rehabilitate, or install permanent or temporary public works, including land acquisition, site reparation, appurtenances, utilities, and equipment. No such funds may be obligated until a period of 30 days has passed after the Administrator or the Administrator's designee has transmitted to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a written report describing the nature of the construction, its cost, and the reasons therefor.

SEC. 7. LIMITATIONS ON AUTHORITY.

Notwithstanding any other provision of this Act, no amount appropriated pursuant to this Act may be used for any program not authorized, or in excess of amounts authorized, by the Congress, unless a period of 30 days has passed after the receipt by the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate of notice given by the Administrator or the Administrator's designee containing a full and complete statement of the action proposed to be taken and the facts and circumstances relied upon in support of such proposed action.

SEC. 8. PROCUREMENT OF SPACE SHUTTLE STRUCTURAL SPARE PARTS.

The Administrator is authorized and encouraged to use up to $50,000,000 of the funds appropriated for orbiter production under section 101(g) of the joint resolution entitled "Joint Resolution making continuing appropriations for the fiscal year 1987, and for other purposes" (100 Stat. 3341-242) to procure shuttle structural spare parts.

SEC. 9. NON-FEDERAL FINANCING OF FACILITIES.

(a) LIMITATION ON GENERAL AUTHORITY FOR NON-FEDERAL FINANCING.—No agreement providing for non-Federal financing of any facility may be entered into by the Administrator unless specific authority is provided by law.

(b) NON-FEDERAL FINANCING AUTHORITY.—The Administrator may enter into agreements providing for non-Federal financing of a neutral buoyancy facility and a payload processing facility. No such agreement shall be entered into until 30 days after the Administrator certifies to the Congress that such agreement is in the best interests of the United States, considering—

(1) net cost savings to the Federal Government over the life of the agreement;

(2) the amount of non-Federal revenues the facility anticipates receiving;

(3) the amount and nature of the equity investment or other risk assumed by the financing source;

(4) the amount of potential exposure to termination liability of the United States under the agreement;

(5) the annual burden of guaranteed payments, if any, incurred by the United States under the agreement; and

(6) the ways in which such agreement promotes the commercialization of space.

Each such certification shall be made using standard accounting practices, and shall be annually updated and resubmitted to the Congress, along with the President's budget request for the National Aeronautics and Space Administration, during the time the agreement is in effect.

(c) PREFERRED AGREEMENTS.—In seeking non-Federal financing under subsection (b), the Administrator shall invite proposals for, and give special preference to, arrangements that may potentially reduce the cost to the United States through—

(1) private sector operation of the facility;

(2) private sector shared use of the facility;

(3) innovative design and construction; and

(4) shared risk arrangements.

In no case shall the Administrator enter into a financing agreement under subsection (b) if to do so would substantially impair the National Aeronautics and Space Administration's program schedule.

(d) TERMINATION LIABILITY.—The Administrator may provide in any agreement entered into under subsection (b) contingent liability in the event the Government for its convenience terminates such agreement. Such agreement shall limit the amount of payments that the Federal Government is required to make for such contingent liability to amounts provided in advance to the National Aeronautics and Space Administration in appropriations Acts. If funds for such purpose have not been provided, such payments shall be made from other unobligated appropriations of the National Aeronautics and Space Administration. In no case shall such agreement provide for contingent liability in excess of 80 percent of the costs resulting from any such termination for convenience.

SEC. 10. GEOGRAPHICAL DISTRIBUTION.

The Administrator shall distribute research and development funds geographically in order to provide the broadest practicable participation in the programs of the National Aeronautics and Space Administration.

SEC. 11. BUY AMERICAN.

(a) GENERAL RULE.—The Administrator shall award to a domestic firm a contract that, under the use of competitive procedures, would be awarded to a foreign firm, if—

(1) the final product of the domestic firm will be completely assembled in the United States;

(2) when completely assembled, not less than 50 percent of the final product of the domestic firm will be domestically produced; and

(3) the difference between the bids submitted by the foreign and domestic firms is not more than 6 percent.

(b) EXCEPTIONS.—This section shall not apply to the extent to which—

(1) such applicability would not be in the public interest;

(2) compelling national security considerations require otherwise; or

(3) the United States Trade Representative determines that such an award would be in violation of the General Agreement on Tariffs and Trade or an international agreement to which the United States is a party.

(c) DEFINITIONS.—For purposes of this section—

(1) the term "domestic firm" means a business entity that is incorporated in the United States and that conducts business operations in the United States;

(2) the term "foreign firm" means a business entity not described in paragraph (1).

(d) LIMITATION.—This section shall apply only to contracts for which—

(1) amounts are made available pursuant to this Act; and

(2) solicitations for bids are issued after the date of the enactment of this Act.

(e) REPORT TO CONGRESS.—The Administrator shall report to the Congress on contracts covered under this section and entered into with foreign entities in fiscal years 1990 and 1991 and shall report to the Congress on the number of contracts that meet the requirements of subsection (a) but which are determined by the United States Trade Representative to be in violation of the General Agreement on Tariffs and Trade or an international agreement to which the United States is a party. The Administrator shall also report to the Congress on the number of contracts covered under this Act and awarded based upon the parameters of this section.

SEC. 12. AMENDMENTS TO THE NATIONAL AERONAUTICS AND SPACE ACT OF 1958.

Section 203 of the National Aeronautics and Space Act of 1958 (42 U.S.C. 2473) is amended—

(1) in subsection (a), by—

(A) striking "and" at the end of paragraph (2);

(B) striking the period at the end of paragraph (3) and inserting in lieu thereof a semicolon; and

(C) adding at the end the following new paragraphs:

"(4) seek and encourage, to the maximum extent possible, the fullest commercial use of space; and

"(5) encourage and provide for Federal Government use of commercially provided space services and hardware, consistent with the requirements of the Federal Government."; and

(2) in subsection (c), by—

(A) striking "and" at the end of paragraph (13);

(B) striking the period at the end of paragraph (14) and inserting in lieu thereof a semicolon; and

(C) adding at the end the following new paragraphs:

"(15) to establish procedures for the procurement on a commercially reasonable basis by the Administration, for itself or other Government agencies, of space launch hardware and services or other space hardware and space services provided by the private sector, on an annual or multiyear basis consistent with Federal Government requirements; and

"(16) to seek and promote the commercial use of space by establishing procedures and developing appropriate agreement terms and conditions which facilitate commercial use of the Administration's facilities and services, consistent with Government needs, and associated commercial facilities and services.".

SEC. 13. COMMERCIAL SPACE LAUNCH ACT AUTHORIZATION.

Section 24 of the Commercial Space Launch Act (49 U.S.C. App. 2623) is amended by adding at the end thereof the following: "There are authorized to be appropriated to the Secretary to carry out this Act $4,392,000 for fiscal year 1990.".

SEC. 14. NATIONAL SPACE COUNCIL AUTHORIZATION.

(a) NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AUTHORIZATION ACT, FISCAL YEAR 1989 AMENDMENTS.—Section 501 of the National Aeronautics and Space Administration Authorization Act, Fiscal Year 1989 (42 U.S.C. 2471) is amended by adding at the end the following new subsections:

"(d) Not more than 6 individuals may be employed by the National Space Council without regard to any provision of law regulating the employment or compensation of persons in the Government service, at rates not to exceed the rate of pay for Level VI of the Senior Executive Schedule as provided pursuant to section 5382 of title 5, United States Code.

"(e) The National Space Council may, for purposes of carrying out its functions, employ experts and consultants in accordance with section 3109 of title 5, United States Code, and may compensate individuals so employed for each day they are involved in a business of the National Space Council (including traveltime) at rates not in excess of the daily equivalent of the maximum rate of pay for grade GS–18 as provided pursuant to section 5332 of title 5, United States Code.

"(f) There are authorized to be appropriated $1,200,000 to carry out the activities of the National Space Council for fiscal year 1990.".

(b) TITLE 5 AMENDMENT.—Section 5314 of title 5, United States Code, is amended by adding at the end thereof the following:

"Executive Secretary, National Space Council.".

SEC. 15. INTERNATIONAL SPACE YEAR.

(a) SENSE OF THE CONGRESS.—It is the sense of the Congress that the President should—

(1) lead the formulation of an International Space Year agenda developed in consultation with foreign leaders;

(2) declare a World Space Congress, to be convened in 1992, to establish a program for cooperative space activities among cooperating nations in space science, space exploration, and the application of space technologies;

(3) invite the American public to develop International Space Year activities that foster the cooperative spirit of the International Space Year; and

(4) direct the National Aeronautics and Space Administration to continue to develop International Space Year activities with a primary emphasis on Mission to Planet Earth, but also with a strong emphasis on the other space sciences, human exploration, education, and developing nations applications.

(b) REPORT TO CONGRESS.—The President shall report to Congress at the earliest practicable date, but no later than January 1, 1990, on the steps taken pursuant to this section.

SEC. 16. ADVANCED SOLID ROCKET MOTOR.

(a) CONTINGENT LIABILITY.—If, pursuant to section 207 of the National Aeronautics and Space Administration Authorization Act, Fiscal Year 1989 (Public Law 100–685), the Administrator selects a proposal for an Advanced Solid Rocket Motor (ASRM) offering a privately financed production facility to be constructed on a Government site, the Administrator may provide in any agreement contingent liability in the event the Government for its convenience terminates such agreement. Such agreement shall limit the amount of payments that the Federal Government is required to make for such contingent liability to amounts provided in advance to the National Aeronautics and Space Administration in appropriation Acts. If funds for

such purpose have not been provided, such payments shall be made from other unobligated appropriations of the National Aeronautics and Space Administration.

(b) IMPACT ON OTHER PROGRAMS.—Nothing in this Act shall preclude the Administrator from developing a liquid or hybrid rocket booster for the space shuttle.

(c) REPORTS TO CONGRESS.—The Administrator shall submit to the Committee on Science, Space, and Technology of the House of Representatives and Committee on Commerce, Science, and Transportation of the Senate the following:

(1) A report on the projected cost (principal and interest) to complete the design, development, and qualification of the Advanced Solid Rocket Motor. The first report shall be submitted at the end of six months after the signing of the ASRM contract and thereafter with the National Aeronautics and Space Administration's annual budget request.

(2) An annual report of interest rate changes on the loan.

(3) An annual report on the projected unit cost of the flight motors.

(4) An annual report on the increase in Space Shuttle payload capability provided by the Advanced Solid Rocket Motor. The report shall include the original baseline payload capability, adjustments to that baseline capability, and the projected payload capability.

(5) An assessment by the National Research Council of the need for the Advanced Solid Rocket Motor by September 1, 1990.

(6) An assessment by the National Research Council of options to the Advanced Solid Rocket Motor to provide desired performance and safety enhancements by September 1, 1990.

SEC. 17. SPACE SHUTTLE USE POLICY.

(a) GENERAL STATEMENT OF POLICY.—It shall be the policy of the United States to use the space shuttle for purposes that require the presence of man or the unique capabilities of the space shuttle.

(b) IMPLEMENTATION REPORT.—The Administrator shall, within 6 months after the date of enactment of this Act, submit a report to the Congress setting forth a plan for the implementation of the policy stated in subsection (a). Such plan shall include—

(1) details of the implementation plan;

(2) a list of purposes that require the presence of man;

(3) a proposed schedule for the implementation of the policy stated in subsection (a);

(4) an estimate of the costs to the United States of implementing the policy stated in subsection (a); and

(5) a list of the special certifications the Administrator expects to make under subsection (c)(1).

(c) SPECIAL CERTIFICATIONS FOR SHUTTLE UNIQUE PAYLOADS THAT DO NOT REQUIRE THE PRESENCE OF MAN.—

(1) SPECIAL CIRCUMSTANCES.—The Administrator shall certify in writing to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate when the Administrator determines that compelling circumstances exist that warrant the use of the space shuttle for purposes that do not require the presence of man. No funds may be expended on space shuttle planning and operations for a mission involving purposes that do not require the presence of man until the expiration of 30 days after such certification.

(2) SECONDARY PAYLOADS.—The policy stated in subsection (a) and paragraph (1) of this subsection shall not preclude the use of available cargo space, on a space shuttle mission otherwise in compliance with such policy, for the purpose of carrying secondary payloads (as such term is defined by the Administrator) that do not require the presence of man.

(d) LIMITATION ON SECONDARY PAYLOADS.—Secondary payloads (as such term is defined by the Administrator) carried on the space shuttle shall include only payloads consistent with requirements for authorized research, development, demonstration, scientific, and commercial programs.

SEC. 18. FAIR PRICING AGREEMENT.

(a) FINDINGS.—Congress finds that—

(1) The export of United States manufactured satellites is a valuable contributor to the United States balance of trade and should be encouraged;

(2) Unfair trade practices which undermine the viability of the United States launch vehicle industry will also ultimately lead to the loss of the United States competitive posture for United States manufactured satellites; and

(3) The viability of the United States commercial launch industry is undermined by competition from the Soviet Union, whose subsidized launch vehicles are priced significantly below world market prices.

(b) It is the policy of the United States that the United States Trade Representative should enter into negotiations for the purpose of achieving fair pricing agreements for international trade in commercial launch services. Such agreement shall support free and fair competition for those services.

(c) PRESIDENTIAL CERTIFICATION.—The policy stated in subsection (b) shall not apply if the President certifies to Congress that the price of launch services offered by the Australians utilizing Soviet Union launch vehicles is not more than 25 percent below the price of a comparable launch vehicle built in a market-based economy, as determined using generally accepted cost accounting standards used in market-based economies.

(d) FURTHER POLICY.—In absence of agreement stated in subsection (b) or Presidential Certification stated in subsection (c), it is the policy of the United States that the export of United States manufactured satellites for launch on Soviet Union manufactured vehicles should be prohibited.

SEC. 19. EXPORT OF SATELLITES FOR LAUNCH BY THE PEOPLE'S REPUBLIC OF CHINA.

(a) EXPORT OF SATELLITES.—Any license for the export of a satellite of United States origin that is intended for launch from a launch vehicle owned by the People's Republic of China (specifically including the Hughes Aircraft Model HS–601 Spacecraft (commercial communications satellites) whose export is described in the certification transmitted to the Congress pursuant to section 36(c) of the Arms Export Control Act on September 12, 1988) shall continue to be suspended, unless the President makes a report under subsection (b) of this section. Any license for such an export that was issued before the enactment of this Act shall also continue to be suspended unless the President makes a report under subsection (b) of this section.

(b) PRESIDENT'S REPORT.—A report referred to in subsection (a) is a report by the President to the Congress—

(1) that the Government of the People's Republic of China has made progress on a program of political reform throughout the country, including Tibet, which includes—

(A) lifting of martial law;

(B) halting of executions and other reprisals against individuals for the nonviolent expression of their political beliefs;

(C) release of political prisoners;

(D) increased respect for internationally recognized human rights, including freedom of expression, the press, assembly, and association; and

(E) permitting a freer flow of information, including an end to the jamming of Voice of America and greater access for foreign journalists; or

(2) that it is in the national security interest of the United States to terminate a suspension under subsection (a).

SEC. 20. LIFE SCIENCES STRATEGIC PLAN.

(a) FINDINGS.—The Congress finds that—

(1) the current knowledge base in life sciences is not compatible with the National Aeronautics Space Administration's current objectives in space, and the National Aeronautics Space Administration lacks an adequate strategic plan to acquire this knowledge base;

(2) it is critical to the success of manned missions in space, be they commercial operations of microgravity laboratories or manned missions to Mars, that a realistic appraisal of the influences of the space environment on biological systems is completed and appropriate protective countermeasures developed;

(3) the space station is rapidly approaching design maturity without a corresponding development of the physiological and other human factors knowledge base necessary for long-term manned operations in space; and

(4) space station laboratory hardware specifications are being fixed before fully establishing the objectives and requirements for life sciences research.

(b) STRATEGIC PLAN.—The Administrator shall—

(1) review currently proposed manned space flight missions in order to—

(A) identify the physiological and other human factors knowledge base necessary to determine the human capacity to adapt to and perform effectively in the space environment according to mission requirements, including identifying which life sciences parameters must be measured and which technologies, processes, and procedures must be developed; and

(B) develop a schedule indicating when specific components of information, technologies, processes, or procedures identified under subparagraph (A) will need to be acquired or developed in order to verify that human adaptability requirements of manned space flight missions can be achieved;

(2) develop a strategic plan for life sciences research and technology development sufficient to accomplish the life sciences knowledge base acquisition schedule developed under paragraph (1)(B), including—

(A) a crew certification plan setting acceptable crew deconditioning standards for Extended Duration Orbiter operations and verifying countermeasures sufficient to meet those standards before actual Extended Duration Orbiter operations; and

(B) a life sciences implementation plan for the design and development of the space station, to be provided as part of the Preliminary Design Review for the space station, and to include crew adaptability standards; and

(3) verify the physiological and technical feasibility of the life sciences implementation plan developed under paragraph (2)(B), as part of the Critical Design Review for the space station.

SEC. 21. COMMISSION FOR INTERNATIONAL COOPERATION IN PLANETARY EXPLORATION.

(a) SHORT TITLE.—This section may be cited as the "Commission for International Cooperation in Planetary Exploration Act".

(b) FINDINGS.—The Congress finds that—

(1) the President on January 5, 1988, established the long-range goal of expanding human presence and activity beyond Earth orbit into the solar system in the twenty-first century;

(2) the United States and the Soviet Union, in cooperation with other countries, are currently planning further unmanned missions to the Moon and to Mars with the possible goal of landing a human on Mars;

(3) a series of international missions to expand human presence beyond Earth orbit would further a spirit of, and follow through on the commitment made in, the 1987 agreement between the Soviet Union and the United States for space cooperation, as well as the successful cooperative agreements the United States has pursued with over one hundred countries since its inception, including the agreement with Japan, Canada, and the European countries for Space Station Freedom;

(4) international manned missions beyond Earth orbit could save the individual nations involved tens of billions of dollars over national missions; and

(5) a multilateral effort for manned missions to establish a lunar colony, a Mars mission, and any other missions that have the goal of establishing human presence beyond Earth's orbit and possibly landing a human on Mars would lead to greater understanding of our universe and greater sensitivity to our own planet.

(c) ESTABLISHMENT.—There is established a commission to be known as the "Commission for International Cooperation in Planetary Exploration" (hereafter in this section referred to as the "Commission").

(d) PURPOSE OF COMMISSION.—The purpose of the Commission is—

(1) to develop an inventory of intentions of all national space agencies with regard to lunar and planetary exploration, both manned and unmanned;

(2) to seek ways to enhance the planning and exchange of information and data among the United States, the Soviet Union, European countries, Canada, Japan, and other interested countries with respect to unmanned projects beyond Earth orbit, in anticipation of later international manned missions to the Moon and to other bodies, including the possible goal of an international manned mission to Mars;

(3) to prepare a detailed proposal that most efficiently uses the resources of the national space agencies in cooperative endeavors to establish human presence beyond Earth orbit;

(4) to develop priority goals that accomplish unmet needs that could not be achieved by any individual country;

(5) to explore the possibilities of international unmanned probes to the Moon and Mars, and the possibilities for international manned missions beyond Earth's orbit; and

(6) to devise strategies for such cooperation that would prevent the unwanted transfer of technology.

(e) MEMBERSHIP.—

(1) NUMBER AND APPOINTMENT.—The Commission shall be composed of 16 members, appointed from among experts in space policy or space science, as follows:

(A) Eight members shall be appointed by the President, one of whom shall be the Chairman of the National Space Council, who shall serve as Chairman of the Commission.

(B) Four members shall be appointed by the Speaker of the House of Representatives.

(C) Four members shall be appointed by the President Pro Tempore of the Senate.

A vacancy in the Commission shall be filled in the manner in which the original appointment was made.

(2) BASIC PAY.—Members of the Commission shall serve without pay.

(f) DIRECTOR AND STAFF OF COMMISSION.—

(1) DIRECTOR.—The Commission shall, without regard to section 5311(b) of title 5, United States Code, have a Director who shall be appointed by the Commission and who shall be paid at the rate of basic pay payable for GS–15 of the General Schedule.

(2) STAFF.—Subject to paragraph (3) and such rules as may be prescribed by the Commission, without regard to section 5311(b) of title 5, United States Code, the Commission may appoint and fix the pay of such additional personnel as the Commission considers appropriate.

(3) APPLICABILITY OF CERTAIN CIVIL SERVICE LAWS.—The staff of the Commission shall be appointed subject to the provisions of title 5, United States Code, governing appointments in the competitive service, and shall be paid in accordance with the provisions of chapter 51 and subchapter III of chapter 53 of such title relating to classification and General Schedule pay rates.

(4) EXPERTS AND CONSULTANTS.—Subject to such rules as may be prescribed by the Commission, the Commission may procure temporary and intermittent services under section 3109(b) of title 5 of the United States Code.

(5) STAFF OF FEDERAL AGENCIES.—Upon request of the Commission, the head of any Federal agency is authorized to detail, on a reimbursable basis, any of the personnel of such agency to the Commission to assist the Commission in carrying out its duties under this section.

(g) POWERS OF COMMISSION.—

(1) HEARINGS AND SESSIONS.—The Commission may, for the purpose of carrying out this section, hold such hearings, sit and act at such times and places, take such testimony, and receive such evidence, as the Commission considers appropriate.

(2) POWERS OF MEMBERS AND AGENTS.—Any member or agent of the Commission may, if so authorized by the Commission, take any action which the Commission is authorized to take by this subsection.

(3) OBTAINING OFFICIAL DATA.—The Commission may secure directly from any department or agency of the United States information necessary to enable it to carry out this section. Upon request of the Chairman of the Commission, the head of such department or agency shall furnish such information to the Commission.

(4) GIFTS.—The Commission may accept, use, and dispose of gifts or donations of services or property.

(5) MAILS.—The Commission may use the United States mails in the same manner and under the same conditions as other departments and agencies of the United States.

(6) ADMINISTRATIVE SUPPORT SERVICES.—The Administrator of General Services shall provide to the Commission on a reimbursable basis such administrative support services as the Commission may request.

(h) REPORT.—The Commission shall, within one year after the date of the enactment of this Act, prepare and submit to the President and the Congress a report—

(1) outlining a preliminary strategy for cooperation among the United States, the Soviet Union, European countries, Canada, Japan, and other interested countries with respect to unmanned projects beyond Earth orbit, in anticipation of later international manned missions to the Moon and to other bodies, including the possible goal of an international manned mission to Mars;

(2) including an initial proposal outlining a possible international manned mission, in coordination with the preliminary strategy referred to in paragraph (1); and

(3) containing an inventory of planned and anticipated missions, manned and unmanned, that are being considered by national space agencies.

(i) TERMINATION.—The Commission shall cease to exist thirty days after submitting its report pursuant to subsection (h), unless the President or the Congress have requested further revisions to the report.

SEC. 22. OFFICE OF SPACE COMMERCE.

(a) ESTABLISHMENT.—There is established within the Department of Commerce an Office of Space Commerce.

(b) FUNCTIONS.—The Office of Space Commerce shall be the principal unit for the coordination of space related issues, programs, and initiatives within the Department of Commerce. The Office shall—

(1) promote private sector investment in space activities by collecting, analyzing, and disseminating information on space markets, and conducting workshops and seminars to increase awareness of commercial space opportunities;

(2) assist commercial space companies in their efforts to do business with the United States Government, and act as an industry advocate within the Executive Branch to ensure that the Government meets its space related requirements, to the fullest extent feasible, with commercially available space goods and services;

(3) ensure that the U.S. Government does not compete with the private sector in the provision of space hardware and services otherwise available from the private sector;

(4) promote the export of space related goods and services;

(5) represent the Department of Commerce in the development of United States policies and in negotiations with foreign countries to ensure free and fair trade internationally in the area of space commerce; and

(6) seek the removal of legal, policy, and institutional impediments to space commerce.

SEC. 23. UPGRADING HISTORIC LANDMARK FACILITIES.

The National Aeronautics and Space Act of 1958 is amended by adding at the end the following new section:

"UPGRADING HISTORIC LANDMARK FACILITIES

"SEC. 312. The Administrator may take whatever actions are necessary to maintain, modify, upgrade, rehabilitate, and expand facilities designated as National Historic Landmarks under the National Historic Preservation Act without regard to sections 106 and 110(f) of such act, unless the proposed actions would alter the basic purposes or elements which were the bases for such designation.".

SEC. 24. NATIONAL AERO-SPACE PLANE PROGRAM.

(a) FINDINGS.—The Congress finds that—

(1) if the United States is to maintain preeminence in military and commercial aeronautics into the next century, research into technology development and validation of the National Aero-Space Plane (NASP) is vital;

(2) the new and advanced materials being developed for the NASP have numerous applications in the military and the civilian aviation industry, as well as in other industries utilizing high temperature technologies;

(3) the benefits to the military and civilian aviation programs from the new and innovative technologies developed in connection with the NASP program in propulsions systems, aerodynamics, and control systems could be enormous, especially for high speed aeronautical and space flight; and

(4) military and commercial spin-off applications of NASP technologies include future superior military aircraft, space transportation systems, and commercial hypersonic aircraft.

(b) ESTABLISHMENT OF PROGRAM.—The Secretary of Defense (hereafter in this section referred to as the "Secretary") and the Administrator shall jointly establish a National Aero-Space Plane program whose objective shall be exclusively the development and demonstration, by 1995, of a primarily air breathing single-stage-to-orbit and long range hypersonic cruise research flight vehicle. The program shall be a research program, and to the extent practicable technological information developed shall be transferred to the military and to the domestic civil aviation and other private industries.

(c) RESPONSIBILITIES.—The Secretary shall have responsibility for procurement, experimental flight vehicles, and overall program administration of the program established under subsection (b). The Administrator shall have responsibility for providing technology development and flight test support and shall have an integral role in the overall program. Representatives of both the Secretary and the Administrator shall participate in all aspects of the program.

(d) MANAGEMENT PLAN.—

(1) The Secretary and the Administrator shall jointly develop a management plan for the program established under subsection (b), which shall include goals, major tasks, anticipated schedules, organizational structure, funding profiles, details of the respective responsibilities of the Secretary and the Administrator, and resource procurement strategies.

(2) The management plan developed pursuant to paragraph (1) shall be submitted to the Congress within 120 days after the date of enactment of this Act.

(e) FUNDING.—For fiscal year 1990, the Secretary shall be responsible for not less than two-thirds of the funding for the program established under this section, and the Administrator shall be responsible for not more than one-third of the funding for such program. For fiscal years after 1990, funding responsibilities shall be in accordance with the management plan developed under subsection (d).

INTRODUCTION

The Committee has again provided multiyear authorization for NASA's major programs and has developed guidelines and provided special authority in critical policy areas. The major provisions of the Bill:

—Direct NASA to rededicate itself to the goal of leadership in critical areas of space science, space exploration, and space commercialization.

—Establish a multi-year funding authorization plan with specific authorization levels for fiscal years 1990, 1991, and 1992 for major research and development and operational programs.

—Prevent expenditure of any funds for Aeronautical and Transatmospheric Research and Technology unless $127 million are made available for the National Aero-Space Plane program.

—Authorize the full $1.6 billion in budget authority for the CRAF/Cassini program of which approximately $30 million will be spent in fiscal year 1990.

—Authorize funding for the NASA inspector general as a separate line item.

—Authorize the use of appropriations previously made for the replacement orbiter for Shuttle structural space parts.

—Provide special authority and guidelines for agreements for the Space Station neutral buoyancy facility and payload processing facility. These guidelines are intended to develop legitimate management and capitalization roles for the private sector in space commercialization.

—Require NASA to geographically distribute funds.

—Provide guidelines for "Buy American" which are consistent with international agreements.

—Direct NASA to use commercially provided space services and hardware, and to procure space launch services if commercially reasonable.

—Authorize funding for the Department of Transportation's Office of Commercial Space Transportation.

—Authorize operations funding for the National Space Council.

—Endorse the International Space Year in 1992 and call on the President to declare a World Space Congress to focus on cooperative space efforts.

—Provide special authority and guidelines for Advanced Solid Rocket Motor contingent liability, and specify that nothing in the Act should inhibit the development of liquid or hybrid rocket boosters.

—Declare that the export of satellites manufactured in the United States contributes valuably to the balance of trade and that unfair trade practices undermine the viability of the United States launch vehicle industry. On this basis the Act states that the policy of the United States should be to negoti-

ate fair pricing agreements. U.S. built satellites would be prohibited for export if such agreements cannot be reached.

—Suspend a specific export license previously granted for the launch of a Hughes satellite on the Chinese Long March Vehicle.

—Direct the Administrator to develop a stategic plan for life sciences which specifically addresses crew operations on the Extended Duration Orbiter, and the design and development of the Space Station as part of the preliminary design review.

—Establish an Office of Space Commerce within the Department of Commerce and outline general functions and responsibilities.

—Establish a Commission for International Cooperation in Planetary Exploration study options for cooperative international space exploration initiatives.

—Authorize the Administrator to modify, upgrade, and otherwise make changes in facilities designated as historic landmarks as required to meet the requirements of authorized programs.

—State Unequivocal Congressional support for the National Aero-Space Plane program by authorizing the program through completion of a flight demonstration.

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PURPOSE OF THE BILL

The purpose of the bill is to authorize appropriations to the National Aeronautics and Space Administration (NASA) for fiscal years 1990, 1991 and 1992, and to the Department of Transportation Office of Commercial Space Transportation, the Department of Commerce Office of Space Commerce, and the National Space Council within the Executive Office of the President. The bill also sets forth special policy provisions and authorities in order to carry out the activities of the national and civil space programs. In summary, the bill provides the following new budget authorities:

AMOUNT OF NEW BUDGET AUTHORITY

	Fiscal year 1990	Fiscal year 1991	Fiscal year 1992
National Aeronautics and Space Administration	[1] $12,793,800,000	$9,271,000,000	[2] $13,282,950,000
Department of Transportation Office of Commercial Space Transportation	$4,392,000	.....	.....
National Space Council	$1,200,000	.....	.....

[1] Includes $1,600,000,000 in multiyear budget authority the CRAF/Cassini mission.
[2] Includes $3,494,400,000 in new budget authority for FY 1992 for the Space Station. Budget authority for the Space Station for FY 1990 and FY 1991 was previously provided by Public Law 100-685.

SUMMARY OF COMMITTEE VIEWS

SPACE STATION

Management and integration.—The Committee expresses concern over the management and integration of the Space Station. Of particular concern is the staffing of the program office at Reston. A report on staffing is due with the annual Capital Development Plan.

Polar platform management.—The Committee expresses concern over the management of the polar platform with the spacecraft being managed by the Office of Space Station while the instruments are managed by the Office of Space Science and Applications (OSSA). The Committee recommends NASA reassess this split management at the preliminary design review to see if OSSA's role should be expanded.

Solar dynamic power.—The Committee is concerned that NASA has rejected proposals for accelerating the development of solar dynamic power systems for the space station and directs NASA to report on the technical cost and operating considerations that led to this decision. The Committee also directs NASA to continue the development of solar dynamic power for the Block I (initial) space station and is opposed to eliminating it from the program due to funding constraints.

SPACE TRANSPORTATION CAPABILITY DEVELOPMENT

Space Station docking module.—The Committee concludes that the docking module is not a suitable project for commercialization and therefore authorizes funding for FY 1990 to initiate hardware design.

Shuttle-C.—The Committee supports the Shuttle-C program and authorizes funding in FY 1990 to continue studies and analyses of the feasibility and role of this heavy-lift launch vehicle.

PHYSICS AND ASTRONOMY

Space Science data management.—The Committee is concerned over the potential explosive growth in all areas of science data and requires that a strategic plan be developed to solve this problem. A report is requested.

Restore funding for STORE/gravity Probe-B.—The Committee expresses concern over deletion of funds for STORE/GP-B in FY 1990 and fully restores funding. The Committee directs that all identified funding be provided to the principal investigator and contractor team.

LIFE SCIENCES

Overall funding for the life sciences.—The Committee is concerned over the relatively slow growth in life sciences budget and is committed to fully funding the program in FY90–FY92. The Committee is also concerned over the low level of involvement of non-NASA groups in life sciences and directs NASA to increase the participation of the private and academic communities in the program.

Lifesat.—The Committee strongly supports the Lifesat program (a recoverable, reusable satellite launched by rockets) and urges NASA to make Lifesat an FY 1991 new start.

PLANETARY EXPLORATION

The Committee expresses interest in establishing a budget line for the Observer missions and calls on NASA to reassess the strategy for future solar system exploration.

SPACE APPLICATIONS

Advanced Communication Technology Satellite (ACTS).—The Committee restores the funds deleted by the Administration for FY 1990. The program is now 75 percent complete. The Committee also encourages NASA to establish a ground station research program.

ACTS relationship to U.S. interests in High Definition Television (HDTV).—The Committee directs NASA to seek ACTS experiments focusing on HDTV development and recommends that NASA encourage the development of HDTV components and techniques, incorporating them into the space station and other programs.

Global change program—Earth Observation Satellites (EOS) and Earth Probes.—The Committee expresses strong support for earth science projects. The Committee also requests the earth probe program begin in FY 1991 and that the next Total Ozone Measure-

ment Spectrometer (TOMS) be launched as the first in the Earth Probes series.

TECHNOLOGY UTILIZATION

Management of the Sterling engine program.—It is suggested that the sponsorship of the sterling engine program be transferred from the Department of Energy (DOE) to NASA. The Committee is concerned over this transfer and directs NASA to participate in an interagency study (with DOE and others) to determine the sponsor for this program. The study should be submitted by 2/1/90.

COMMERCIAL USE OF SPACE

Office of Commercial Programs—as a focal point for commercial space policy.—The Committee is concerned that the Office of Commercial Programs is not the focal point for commercial programs and policy in NASA and charges NASA to increase the scope of the Office.

Commercial flight opportunities.—It is the Committee's intent that NASA provide more opportunities for small commercial payloads. The Committee also includes language to amend the NASA Act to "seek and encourage to the maximum extent possible the fullest commercial use of space."

Center for Commercial Development of Space (CCDS) in Education.—The Committee recommends that NASA establish a Center for Commercial Development of Space (CCDS) in education.

External tanks.—The Committee commends NASA for working to promote commercial uses of the jettisoned Shuttle external tanks and urges NASA toward an early demonstration of their use in orbit.

AERONAUTICAL RESEARCH AND TECHNOLOGY

Aeronautical materials development.—The Committee directs NASA to coordinate with the Air Force to insure there is no duplication of effort in non-metallic structures technology research as well as directing NASA to manage a balanced program in its new Advanced Composite Technology Initiative.

SPACE RESEARCH AND TECHNOLOGY

Management instability.—The Committee is concerned over the high-level of turnover in the upper levels of management within the Office of Aeronautics and Space Technology.

Expendable launch vehicle research and development.—The Committee provides $5M for funding for research and development in support of commercial launch vehicle component technology.

Pathfinders.—The Committee increased funding of the Pathfinder program because of a concern that NASA's level of support for basic technology research is inadequate.

SPACE EXPLORATION

Space exploration budget line.—The rationale for a separate budget line for space exploration is given, and the Committee requests NASA to establish such a line in future budget submissions.

International participation in exploration.—The Committee expresses a desire for international participation on the next major manned exploration initiative and recommends that NASA begin studies of candidate cooperative missions.

Moon and Mars initiatives.—The Committee requires that the Administration present to Congress an implementation plan to carry out the recent initiatives (a lunar base followed by a manned Mars mission) proposed by the President. The plan, due 1/15/90, should include milestones, target dates, anticipated costs, opportunities for international participation, and proposed mechanisms to fund the initiatives.

UNIVERSITY SPACE SCIENCE AND TECHNOLOGY ACADEMIC PROGRAMS

The Committee supports the gathering together of university/educational programs within a new budget line and believes this will help expand the commitment of students in space science and technology. The Committee also directs NASA to accelerate the growth of the National Space Grant College and Fellowship Program.

CRAF/CASSINI

The attributes of the Comet Rendezvous Asteroid Flyby (CRAF) and Cassini missions are discussed and, the Committee proposes multiyear funding for this new start.

SPACE SHUTTLE PRODUCTION AND OPERATIONAL CAPABILITY

Orbiter production line.—The Committee expresses concern over the lack of policy regarding future Orbiter production and directs NASA to develop a long-range plan. A report is due 3/1/90.

Production vulnerability of the space program.—The Committee is concerned over the vulnerability of the space program to the loss of a key lower-tier supplier and directs NASA to develop policy and plans to deal with this vulnerability. A report including draft policies and plans is due 7/1/90.

Hardware improvements.—The Committee encourages hardware improvements that increase the safety of the Shuttle and requests that NASA study the feasibility automating the deorbit and landing operations of the Space Shuttle. A report is due 4/15/90.

SPACE SHUTTLE OPERATIONS

Economies within the Space Shuttle Program.—The Committee notes the need to maintain a high quality Shuttle program, but encourages NASA to be vigilant for ways to reduce funding without decreasing quality and safety.

EXPENDABLE LAUNCH VEHICLES

The Committee expresses concern about some of the payloads that have been retained on the Space Shuttle rather than being moved to expendable launch vehicles (ELVs). The Committee also expresses a belief that all future generations of Tracking and Data Relay Satellites should be placed on ELVs. Additionally, the Committee notes the national policy adopted in sec. 3(7) requiring that

Space Station resupply activities be compatible with both expendable launch vehicles as well as the Space Shuttle.

INSPECTOR GENERAL

The Committee discusses its intent that the Inspector General be aggressive and have enough resources to be independent.

DEPARTMENT OF COMMERCE

The Committee authorizes the establishment of an Office of Space Commerce within the Department of Commerce.

LEGISLATIVE REPORTING REQUIREMENTS

REFERENCE AND REQUIREMENT

Section 4—A report summarizing the results for the CRAF/Cassini Mission on the following: (i) Preliminary Design Review, (ii) Critical Design Review, and (iii) Spacecraft Integration and Systems Test.

Section 4—A report on the safety enhancements specified for the Shuttle by September 30, 1990.

Section 5—A report for special reprogramming authority for construction of facilities.

Section 9—A certification regarding non-federal financing of a Neutral Buoyancy Facility and Payload Processing Facility.

Section 11—A report on the nature and number of foreign and domestic contracts awarded under the Buy-American rule.

Section 15—A progress report to Congress by the President concerning the development of International Space Year.

Section 16—A report on the Advanced Solid Rocket Motor Program which: (i) determines the projected cost, (ii) follows interest rate changes on the loan (annual), (iii) determines projected unit cost of flight motors (annual), (iv) determines its role in increasing payload capability (annual), (v) assesses its need to the space program (by September 1, 1990), and (vi) assesses the options available for enhancing its safety and performance by September 1, 1990.

Section 17—A plan detailing the implementation of the Space Shuttle use policy within six months of enactment of this Act.

Section 20—A plan providing for the development of an adequate life sciences knowledge base with respect to human adaptability requirements.

Section 21—A proposal by the Commission for International Cooperation in Planetary Exploration to coordinate most efficiently the resources of the participating nations.

Section 21—A report by the Commission formulating a strategy for unmanned and manned international missions.

Section 24—A management plan developed by the Secretary of Defense and the Administrator of the National Aeronautics and Space Administration describing the major objectives of the National Aerospace Plane Program.

EXPLANATION OF THE BILL AND COMMITTEE VIEWS

SECTION 1: SHORT TITLE

Section 1 designates that the act may be cited as the "National Aeronautics and Space Administration Multiyear Authorization Act of 1989".

SECTION 2: FINDINGS

Section 2(1) finds that the aeronautics and space program is supported by an overwhelming majority of the American people.

Section 2(2) recognizes that the United States aeronautics and space program reflects our Nation's pioneer heritage, and demonstrates our quest for leadership, economic growth, and human understanding.

Section 2(3) declares that the United States space program is based on a solid record of achievement and encourages international cooperation in the exploration of the Universe.

Section 2(4) recognizes the critical technology breakthrough generated by the United States aeronautics and space program which benefit our economy and greatly improve our standard of living.

Section 2(5) states that the United States aeronautics and space program excites the imagination of every generation and encourages the youth of our Nation to pursue excellence in science and mathematics.

Section 2(6) declares that the United States aeronautics and space program contributes to the Nation's technological competitive advantage.

Section 2(7) expresses the need for sustained commitment of financial and human resources to the aeronautics and space program.

Section 2(8) stresses the need for a robust fleet of Space Shuttle Orbiters and expendable launch vehicles in order to maintain an adequate space transportation system.

Section 2(9) declares that leadership in space will be enhanced by the deployment of a permanently manned space station which should include research, observation, servicing, manufacturing, and staging capabilities.

Section 2(10) states that the United States' preeminence in aviation is due to the United States' aeronautics program;

Section 2(11) stresses the need to maintain a strong transatmospheric research and technology program.

Section 2(12) declares that the National Aeronautics and Space Administration is primarily responsible for formulating and implementing the civil aeronautics and space program of the United States.

SECTION 3: POLICY

Section 3(1) states that the United States must rededicate itself to the goal of leadership in the critical areas of space science, space exploration, and space commercialization.

Section 3(2) directs the United States to increase funding for the space program to reverse the decline in real spending following the Apollo program.

Section 3(3) emphasizes the need for a healthy balance between manned and unmanned space activities recognizing the mutually reinforcing benefits of both.

Section 3(4) states the need to maintain an active fleet of Space Shuttle Orbiters and structural spare parts. The design of the Orbiter should continue evolving to improve safety and performance, and to reduce operational costs.

Section 3(5) states that a mixed fleet must be maintained by utilizing commercial expendable launch vehicles.

Section 3(6) emphasizes the need to develop and deploy a permanently manned space station.

Section 3(7) states that the space station shall be serviced by both space shuttles and commercial expendable launch vehicles.

Section 3(8) directs NASA to continue to seek opportunities for international cooperation in space.

Section 3(9) emphasizes the need to maintain an aggressive program of aeronautical research and technology.

Section 3(10) directs NASA to conduct a program to prove the feasibility of single-stage-to-orbit operation.

SECTION 4: AUTHORIZATION OF APPROPRIATIONS

Section 4 provides a three year authorization of appropriations for the National Aeronautics and Space Administration and related provisions. Sections 4 (1), (2), (3), (4), and (5) contain authorization levels for NASA programs for fiscal years 1990, 1991, and 1992, which are reflected in the chart below.

FISCAL YEARS 1990, 1991, AND 1992 NASA AUTHORIZATION SUMMARY

[In millions of dollars]

	Authorization fiscal year 1990	Authorization fiscal year 1991	Authorization fiscal year 1992
Research and Development:			
Space Station	(2,130.2)	(2,912.5)	(3,494.4)
Flight Telerobotic Servicer	(15.0)	.....	.....
Space Station Docking Module	(3.7)	.....	.....
Space Transportation Capability Development	651.5	716.0	676.0
Space Science and Applications:			
Physics and Astronomy	914.5	1,013.0	1,147.0
Life Science	124.2	154.0	151.0
Planetary Exploration	361.9	322.0	278.0
Space Applications	646.0	552.0	518.0
ACTS Experimenter Ground stations	(2.0)	(2.0)	(2.0)
Commercial Programs:			
Technology Utilization	22.7	23.4	21.2

FISCAL YEARS 1990, 1991, AND 1992 NASA AUTHORIZATION SUMMARY—Continued

[In millions of dollars]

	Authorization fiscal year 1990	Authorization fiscal year 1991	Authorization fiscal year 1992
Commercial Use of Space	40.3	59.7	92.45
Aeronautical and Transatmospheric Research and Technology	589.8	621.0	603.0
Space Research and Technology	358.1	487.0	530.0
Space Exploration	20.0	35.0	100.0
Safety, Reliability and Quality Assurance	23.3	24.0	24.0
Tracking and Data Advanced Systems	19.9	21.0	22.0
University Space Science and Technology	35.0	40.0	45.0
CRAF/Cassini	1,600.0	.....	.....
Obligated Funds	(30.0)	(148.0)	(313.0)
Space Flight, Control and Data Communications:			
Shuttle Production and Capability Development	1,264.5	1,303.0	1,368.0
Safety enhancements to Shuttle Orbiter	(90.0)	.....	.....
Space Shuttle Operations	2,500.7	2,491.9	2,667.9
Expendable Launch Vehicles	171.5	240.0	308.0
ELV Services, studies, and Spacecraft Modification for the TDRS–G satellite	(2.0)	(26.0)	(66.0)
Space and Ground Networks, Communications and Data Systems	1,077.1	1,159.0	1,228.0
Construction of Facilities	(331.8)	.....	.....
Addition for Space Systems Automated Integration and Assembly Facility, Johnson Space Center	10.5	.....	.....
Addition to Mission Control Center, Johnson Space Center	17.8	.....	.....
Addition to Simulator/Training Facility, Johnson Space Center	3.8	.....	.....
Modifications for Expanded Solar Simulation, Johnson Space Center	2.0	.....	.....
Modifications of Process Technology Facility for Space Station, Marshall Space Flight Center	4.0	.....	.....
Replace Cooling Towers, Launch Complex 39 Utility Annex, Kennedy Space Center	4.6	.....	.....
Replace Pad A Chillers and Controls, Launch Complex 39, Kennedy Space Center	1.2	.....	.....
Replace Roofs, Launch Complex 39, Kennedy Space Center	11.0	.....	.....
Replace Vehicle Assembly Building Air Handling Units, Kennedy Space Center	1.8	.....	.....
Upgrade Orbiter Modification and Refurbishment Facility to Orbiter Processing Facility #3, Kennedy Space Center	26.0	.....	.....
Modification of High Pressure Industrial Water System, Stennis Space Center	2.0	.....	.....

FISCAL YEARS 1990, 1991, AND 1992 NASA AUTHORIZATION SUMMARY—Continued

[In millions of dollars]

	Authorization fiscal year 1990	Authorization fiscal year 1991	Authorization fiscal year 1992
Replacement of High Pressure Gas Storage Vessels, Stennis Space Center	3.0		
Construction of natural resource protection at various locations	3.8		
Refurbish bridges, Merritt Island, Kennedy Space Center	4.5		
Rehabilitation of Spacecraft Assembly and Encapsulation Facility II, Kennedy Space Center	3.5		
Rehabilitation of Central Heating/Cooling Plant, Johnson Space Center	2.8		
Construction of Data Operations Facility, Goodard Space Flight Center	12.0		
Construction of Quality Assurance and Detector Development Laboratory, Goddard Space Flight Center	7.5		
Modernization of South Utility Systems, Jet Propulsion Laboratory	5.4		
Construction of 40 x 80 Drive Motor Roof, Ames Research Center	1.0		
Modifications to Thermo-Physics Facilities, Ames Research Center	4.6		
Modifications to 14 x 22 Subsonic Wind Tunnel, Langley Research Center	1.0		
Modifications to National Transonic Facility for Productivity, Langley Research Center	7.6		
Modifications to 20-Foot Vertical Spin Tunnel, Langley Research Center	1.9		
Rehabilitation of Central Air Systems, Lewis Research Center	2.4		
Rehabilitation of Central Refrigeration Equipment, Lewis Research Center	7.2		
Rehabilitation of 8 x 6 Supersonic and 9 x 15 Low-Speed Wind Tunnels, Lewis Research Center	6.8		
Rehabilitation of Hypersonic Tunnel, Plum Brook	4.1		
Repair and Modernization of the 12-Foot Pressure Wind Tunnel, Ames Research Center	27.6		
Construction and Automation Sciences Research Facility, Ames Research Center	10.6		
Construction of Supersonic/Hypersonic Low Disturbance Tunnel, Langley Research Center	6.9		
Modifications for Seismic Safety, Goldstone, CA, Jet Propulsion Laboratory	2.6		

FISCAL YEARS 1990, 1991, AND 1992 NASA AUTHORIZATION SUMMARY—Continued

[In millions of dollars]

	Authorization fiscal year 1990	Authorization fiscal year 1991	Authorization fiscal year 1992
Repair of facilities at various locations, not exceeding $750,000 per project	28.0	.....	.....
Rehabilitation and modification of facilities at various locations, not in excess of $750,000 per project	36.0	.....	.....
Minor Construction of new facilities and additions to existing facilities at various locations, not in excess of $500,000 per project	10.0	.....	.....
Environmental compliance and restoration	30.0	.....	.....
Facility planning and design not otherwise provided for	26.3	.....	.....
Construction of Observational Instrument Laboratory	14.0	.....	.....
Research and Program Management	2,032.2	.....	.....
Inspector General	8.8	9.0	9.0

SECTION 4(1) RESEARCH AND DEVELOPMENT

Section 4(1)(A) Space Station Freedom

President's request accompanying fiscal year 1990 budget:	
Fiscal year:	
1990	$2,050,200,000
1991	2,980,500,000
1992	3,494,400,000
Fiscal year 1989 NASA Authorization Act, Public Law 100–685:	
Fiscal year:	
1990	2,130,200,000
1991	2,912,500,000
Committee recommendation:	
Fiscal year:	
1990	2,130,200,000
1991	2,912,500,000

Committee authorization recommendation

Section 4(1)(A) authorizes certain uses of funds previously authorized under Public Law 100–685 for the Space Station Freedom. Public Law 100–685 made available $2,130,200,000 for FY 1990 and $2,912,500,000 for FY 1991. Section 4(1)(A) provides authority to obligate $15,000,000 in FY 1990 for the Flight Telerobotic Servicer (FTS) program. Section 4(1)(A) also provides authority to obligate $3,700,000 in FY 1990 for the Space Station Docking Module program. Section 4(1)(A) also authorizes the amount of $3,494,400,000 in FY 1992 for Space Station Freedom.

Program description

The Space Station program will provide an opportunity to gain direct experience in long-term human operations in space, and knowledge essential to future space exploration. The Space Station will uniquely enhance the U.S. space science programs, further the

commercial utilization of space, and stimulate the development and application of advanced technologies of national importance. It is a centerpiece for international cooperation demonstrating the peaceful use of space for the benefit of all mankind.

The basic configuration of the Space Station Freedom and the supporting elements is directly dependent on the anticipated budget and is the result of a lengthy, iterative, three-year process involving NASA centers, U.S. industry, the international partners, and national and international science communities. The Station configuration is comprised of a single horizontal boom structure with 75KW of photovoltaic power, the U.S. laboratory and habitability modules, two international laboratory modules (one European and one Japanese), and a Canadian mobile servicing capability. These elements comprise the manned base, and provide internal and external accommodations for the attachment of science and application payloads. There are also two science and applications platforms, one U.S. and one European, to be launched into polar orbit. A man-tended free-flyer is also under development by ESA as a co-orbiting platform with the manned base. The launch of the first element is planned for March 1995.

The management of U.S. Space Station hardware elements design and development is led by four NASA field centers. The Space Station Program Office (SSPO), located in Reston, Virginia, has the task of managing and integrating the technical development of the entire program. The four "work package" centers are the Marshall Space Flight Center (MSFC) in Huntsville, Alabama; the Johnson Space Center (JSC) in Houston, Texas; the Goddard Space Flight Center (GSFC) in Greenbelt, Maryland; and the Lewis Research Center (LeRC) in Cleveland, Ohio. While not work package centers, the Kennedy Space Center (KSC) at Cape Canaveral, Florida and the Langley Research Center (LaRC) in Hampton, Virginia, have key Space Station responsibilities. KSC has the responsibility for Space Station prelaunch processing and post-landing activities plus a major role in logistics and user integration support while LaRC provides major support in systems engineering and integration. The Jet Propulsion Laboratory (JPL) in Pasadena, California, will also play a central role in defining Space Station program requirements and conducting independent assessments. The work package approach utilizes NASA expertise at the field centers and fosters greater competition among U.S. industry.

During 1988, the program accomplished a Program Requirements Review (PRR), a very thorough and extensive analysis of the program requirements. The purpose of this PRR was to evaluate requirements and to ensure horizontal and vertical consistency in the requirements and in the program documentation. Over six thousand review item discrepancies were surfaced and are being resolved. All of the Space Station program elements, systems, and participants were included.

Committee views

Management and integration

The Committee continues to be concerned over the management and integration efforts of the Space Station program. As noted in

the report accompanying the FY 1989 NASA Authorization Act, the management of the Station program represents a challenge at least as great as the technical challenge. It will be a management challenge to coordinate and integrate to the proposed cost and schedule the activities of at least four NASA field centers, four fully integrated prime contractors, and hundreds of subcontractors to ensure that a Space Station is produced.

Much of the management burden falls on the level II program office in Reston, Virginia. However, while the Reston Center has had a planned civil service complement of 348, the current workforce is under strength at 218 and is especially short of experts in the key discipline of systems engineering and integration. The Committee recognizes that NASA is making a concentrated effort to staff up the level II office in Reston in this discipline. However, the results to date have been marginal.

To better understand the progress made addressing management deficiencies the Committee requests an annual report on the management situation in Reston until the launch of the first element. The report should include information on staffing levels (both civil service and contractors), use of Reston contractors, interfaces/controls with other elements of the program, and any work that is not being accomplished because of personnel shortages. This report may be included as a part of the annual Space Station Capital Development Plan required under Public Law 100–147.

Polar platform management

The polar platform is now being viewed as NASA's contribution to a comprehensive global climate change study. The instrument acquisition will be managed by the Office of Space Science and Applications (OSSA), and the spacecraft development is currently being managed by the Office of Space Station (OSS) because of potential cost savings due to commonality of subsystems between the platform and the manned base.

The Committee is concerned that this split in management could potentially result in a more costly program that delivers less science. OSSA has a long experience in developing and operating unmanned spacecraft and has the technical and management expertise for developing/operating unmanned missions. In addition, despite the potential cost savings due to commonality, the Space Station program's primary intent is to achieve permanent manned presence in space. The Committee believes that under severe budgetary pressures, the unmanned polar platform may not receive adequate management attention in view of this underlying motive.

NASA should revisit the management of the polar platform at the Preliminary Design Review and determine if there is enough commonality to continue the dual management approach. Otherwise, the Committee recommends that OSSA be provided an expanded management role for the polar platform.

Solar dynamic power

The Committee has consistently expressed the view that solar dynamic power is an important element of the Space Station Freedom program for meeting user requirements and ensuring cost-effective operations of the Station over the long-term. In addition,

solar dynamic power will contribute to American technological competitiveness, and should, therefore, be developed and ultimately deployed as an integral part of Space Station Freedom.

The Committee is concerned that NASA has rejected proposals for accelerating development of solar dynamic power. In this regard, the Committee directs NASA to report on the technical cost and operating considerations that led to this decision. Moreover, the Committee firmly states in advance its opposition to any potential future effort to eliminate solar dynamic power from Station as a consequence of overall program funding constraints.

The Committee directs NASA to continue solar dynamic power development as an integral part of Space Station Freedom Block I, and encourages continued review of options for accelerating the full incorporation of solar dynamic power capabilities into the Block I program.

Section 4(1)(B) Space transportation capability development

President's request:	
Fiscal year 1990	$639,000,000
Committee recommendation:	
Fiscal year:	
1990	651,500,000
1991	716,000,000
1992	676,000,000

Committee authorization recommendation

Section 4(1)(B) authorizes appropriations of $651,500,000 for fiscal year 1990 for Space Transportation Capability Development activities. This is $12,500,000 above the President's request. This increase is the net result of: a $6,000,000 increase to restore funding for the upper stage that will be needed to launch the Advanced Communication's Technology Satellite; a $3,500,000 reduction due to the Administration's decision not to pursue the development of a Commercially Developed Space Facility (CDSF) at this time; a $15,000,000 increase to fund continuing studies and analysis of the feasibility and role of the Shuttle-C heavy-lift launch vehicle; and a reduction of $5,000,000 reflecting the transfer of funds in an equal amount to the new Space Exploration line item—Section 4(1)(L).

Section 4(1)(B) also authorizes the appropriation of $716,000,000 for fiscal year 1991 and $676,000,000 for fiscal year 1992 for Space Transportation Capability Development activities. The authorization for fiscal year 1991 is based on an Administration baseline of $693,000,000 and the addition of $6,000,000 to continue procurement of the upper stage for the Advanced Communications Technology Satellite and $17,000,000 to continue development of the Space Station Docking Module. The authorization for fiscal year 1992 is based on an Administration baseline of $649,000,000 and the addition of $4,000,000 to continue procurement of the upper stage for the Advanced Communications Technology Satellite and $23,000,000 to continue development of the Space Station Docking Module.

Program description

The principal areas of activity within Space Transportation Capability Development include: the development, procurement, and

operation of Spacelab flight hardware; the development and procurement of the upper stages that are required to place satellites into high altitude orbits; the provision of engineering and technical base support for the manned space flight centers; the provision of the payload operations and s .pport equipment that are required to support payloads that will f y on the Space Shuttle; the study and evaluation of possible advanced programs; research and analysis for the Advanced Launch System (ALS) program; developmental support for the joint Italian/U.S. Tethered Satellite System; and the development and first flight of the Orbital Maneuvering Vehicle (OMV).

Committee views

Space station docking module

During this year's authorization hearings, the Committee devoted a significant amount of attention to the commercialization initiatives that were reflected within the President's fiscal year 1990 budget request for NASA.

The preponderance of testimony at these hearings held that the Space Station Docking Module is not suitable for the type of commercialization that was proposed by the Administration. Accordingly, the Committee has concluded that the Docking Module should be funded through the normal authorization and appropriation process.

Given the importance of the Docking Module to the functioning and success of the Space Station and the significant impact that a delay in the funding of this Module could have on the Space Station program, the Committee has authorized the appropriation of funds in fiscal year 1990 to begin the design and development of the Space Station Docking Module.

Space Shuttle-C

The Committee has followed with interest the progress that is being made in the conceptual design and feasibility studies for using components of the Space Shuttle to build an unmanned, heavy-lift launch vehicle.

For several years, the Committee has recognized the potential usefulness of such a vehicle for carrying payloads that are too large to be handled by the Space Shuttle or existing expendable launch vehicles. The Committee also notes that recent studies have indicated that the Shuttle-C could be of great value in placing elements of the Space Station Freedom into orbit—with 5 Shuttle-C launches being able to take the place of 12 Space Shuttle launches.

During this year's authorization hearings, the NASA Administrator and many other key witnesses emphasized the importance of developing the Shuttle-C. However, these witnesses noted that a "new start" for this program would not be requested before fiscal year 1991.

Given that all near-term funding for the Shuttle-C is scheduled to end during the current fiscal year (1989), the Committee is concerned that valuable momentum and project teams will be lost—substantially hampering the program if a decision is made to begin full scale development in fiscal year 1991. Accordingly, the Com-

mittee has authorized the appropriation of funds in FY 1990 to continue the conceptual development of flight hardware, and the analysis of possible missions for the Shuttle–C heavy-lift launch vehicle. The Committee believes that such an extension of the present study phase will be of great value during the Preliminary Design Review for the Space Station, now scheduled to take place during the fourth quarter of FY 1990.

Section 4(1)(C) Physics and astronomy

President's request:	
Fiscal year 1990	$894,500,000
Committee recommendation:	
Fiscal year:	
1990	914,500,000
1991	1,013,000,000
1992	1,147,000,000

Committee authorization recommendation

Section 4(1)(C) authorizes appropriations of $914,500,000 for fiscal year 1990 for Physics and Astronomy activities. This is $20,000,000 above the President's request. This increase is for the purpose of restoring funding to the Shuttle Test of Relativity Experiment/ Gravity Probe–B (STORE/GP–B).

The Committee would like to make special note that it fully endorses the $204,800,000 in funding the Administration has requested for Mission Operations and Data Analysis. This amount represents an increase over earlier projections which reflects a higher priority being placed on the data analysis component of a successful space science initiative. The Committee feels that the data collected on these missions is much like other national resources and should be invested in and preserved for future generations.

Section 4(1)(C) authorizes the appropriations of $1,013,000,000 for fiscal year 1991 and $1,147,000,000 for fiscal year 1992 for Physics and Astronomy activities. The authorization for fiscal year 1991 is based on the Administration baseline of $988,000,000 and the addition of $25,000,000 to continue the STORE/GP–B program. The authorization for fiscal year 1992 is based on the Administration baseline of $1,112,000,000 and the addition of $35,000,000 to perform the STORE flight test and continue the GP–B program. The Committee intends that all of the fiscal year 1990, 1991 and 1992 funds for STORE/GP–B be applied directly and completely to Principal Investigator and Contractor Costs.

Program description

In FY 1990 two out of four Great Observatories will be launched: the Hubble Space Telescope and the Gamma Ray Observatory (GRO). Instrument development for the third great observatory, the Advanced X-ray Astrophysics Facility (AXAF), is planned for FY 1990.

In FY 1990, two major Explorer missions will be under development: the Cosmic Background Explorer and the Extreme Ultraviolet Explorer. A third mission, the X-ray Timing Explorer will be under definition.

Taking advantage of the opportunity of collaboration with other agencies and countries, instruments are being developed to be

placed on the German Roentgen Satellite (ROSAT), and instrument for the DOD CRRES mission, and instruments for the Japanese Solar-A mission and the Japanese Astro-D Spectrographic X-ray Observatory mission.

Under continuing development is the FY 88 new start, the Global Geospace Science (GGS) mission. This mission is complementary to the Collaborative Solar Terrestrial Research Project (COSTR). Both projects are being developed in cooperation with the European Space Agency (ESA) and the Japanese Institute of Space and Aeronautical Science (ISAS). GGS will study the dynamics of energy flow and allow the U.S. to take a leadership role in solar-terrestrial physics.

Physicists and engineers in academia and industry have collaborated to create new technologies to perform the Shuttle Test of Relativity (STORE) experiment that will probe the very foundations of space time. Already development of the test prototype has led to technology spin offs, inspired new physics experiments, and contributed to the undergraduate and graduate education of 58 students. Funding in 1990 will be used to prepare for the Shuttle flight test of the prototype hardware in 1993. The free flying science mission, Gravity Probe-B could then take place in 1995.

And finally, the Astrophysics program is continuing its involvement in the Shuttle/Spacelab program with Astro-1, a set of ultraviolet and soft x-ray telescopes and spectrometers, scheduled for launch in FY 1990. Astro-1 will investigate the interstellar medium by following up on discoveries made with the International Ultraviolet Explorer.

Committee views

Space science data management

The Committee notes that the Office of Space Science and Applications (OSSA) has produced a Strategic Plan for Space Science. This type of foresight and organization is a great benefit to the space science community. The Community would like to see a similar effort made to identify requirements for data management in the coming years.

The Committee notes that science missions occurring in the next decade will result in an exponential growth of science data. This data will require enhanced facilities for reception, transmission, processing, analysis, distribution and archiving. It is not clear that there exists an adequate understanding of the implications of this exponential rise nor anticipation of the resources needed to meet the life cycle costs of the data. In particular, the Committee notes that despite NASA's declared intention to improve data management, NASA has budgeted less money per unit of data than it has in the past.

The Committee directs NASA to produce a long-range strategic plan for addressing all aspects of this data management problem for all divisions of space science in OSSA. The plan should include the following:

a. a determination of the amount of data that will be collected by all currently planned missions and the level of processing desired for that data;

b. a determination of the cost of data processing per unit volume of data, taken to its desired level of processing;

c. a determination of the cost of data archiving per unit volume of data at each level of processing;

d. a determination of the hardware requirements to receive, process, distribute and store this data;

e. a reassessment of the adequacy of current plans and funding allowances for data centers; and,

f. a determination of the human requirements to process and research that data. (This should identify the number and size of research grants which will be provided to principal investigators, guest investigators, and archival researchers.)

Without a plan encompassing all of these needs, it is fair to say, based on past performance, that much of the new data will be under-utilized and even lost.

Science missions are growing increasingly ambitious and complex. At the same time universities are playing a smaller role in the development and manufacture of spacecraft. It should be recognized that university participation, from the earliest stages of planning and throughout the development of the mission is critical. In order to see that the data returned from these missions is utilized effectively, the science community must be brought back into the process of outlining the requirements for data management for all phases of the data stream from acquisition, capture, processing, distribution, analysis, archiving, to distribution. Data management strategies that do not reflect the needs of the scientific community, are not strategies that will produce good science.

Committee restores funding for STORE/GP-B

The Committee regrets that this experiment was deleted in the FY 1990 budget request. This experiment is a flight test of the instrumentation that will be used in Gravity Probe-B. Gravity Probe-B is the relativity gyroscope experiment being developed to test two extraordinary and as yet unverified predictions of Einstein's General Theory of Relativity. Gravity Probe-B is potentially one of the most significant contributions to theoretical physics ever undertaken by NASA. Reviews of the program by NASA project managers indicate that it has been consistently rated high for quality, efficiency, and performance. It is bringing together an impressive array of talented scientists and graduate students from NASA, the academic community and industry. Already the research on Gravity Probe-B has led to spin-off developments in astronomy, oceanography, navigation, meteorology, and fundamental physics. Gravity Probe-B is an experiment of great merit that deserves to be completed. This Committee has long supported this project and will continue to do so.

The Committee has restored $20,000,000 to the FY 1990 budget request for the Shuttle Test of Relativity Experiment (STORE). By this action, the Committee implies a commitment to complete the Gravity Probe-B Experiment Program.

Section 4(1)(E) Space life sciences

President's request:	
Fiscal year 1990	$124,200,000

Committee recommendation:

Fiscal year:	
1990	124,200,000
1991	154,000,000
1992	151,000,000

Committee authorization recommendation

Section 4(1)(D) authorizes appropriations of $124,200,000 for fiscal year 1990 for the Life Sciences program. The Life Sciences program has been reduced in funding in years past and full funding of this program is now essential to support basic operations of the Shuttle/Spacelab and new initiatives on Space Station. Section 4(1)(D) also authorizes the appropriation of $154,000,000 for fiscal year 1991 and $151,000,000 for fiscal year 1992 for Space Life Sciences activities. The authorization provides for the full Administration baseline in each of these years.

Program description

Progress by the Space Life Sciences Program is urgently needed to develop medical and biological criteria to qualify human habitation in space. Results from the research program are applied to: the immediate needs of maintaining astronaut health and productivity; understanding the biological effects of weightlessness; the design of controlled ecological life support systems; understanding of the origin, evolution and distribution of life in the universe; and understanding of the processes and rhythms of the earth's biosphere. An aggressive Space Life Sciences program is essential to meet the needs of Shuttle, Spacelab and Space Station operations, as well as to meet the future needs associated with extending the presence of man in the solar system.

In FY 1990, Space Life Sciences will support an active program of space-based and ground-based research. The flight program includes the first dedicated life sciences mission, Spacelab Life Sciences 1 (SLS–1) and additional Spacelab and middeck experiments to prepare for extended duration Shuttle missions. In FY 1990 the definition and development of the centrifuge facility for Spacelab will begin.

Ground-based research and analysis will proceed to define how space biology research will be accommodated on the Space Station. Information will be collected on occupational exposure to microgravity on each Shuttle flight and conduct in-flight testing of countermeasures. New methods will be developed to control the interior environment of manned spacecraft. Models of the early solar system evolution will be investigated. In FY 1990 the definition and design phase of the microwave observing project will be completed which will be used to survey our galaxy for evidence of technologically advanced life. Ground-based measurements will be combined with remote sensing data to model interactions of ecosystems on a global scale. Also in FY 1990, Specialized Centers of Research (SCOR) will be established at universities to support long-term, broad-based interdisciplinary research on selected high priority topics.

Committee views

Overall funding for the life sciences

The Committee recognizes that past NASA requests for funding growth in the Space Life Sciences have not been accommodated. In fact, the Space Life Sciences budget has been cut in previous years. The Committee is keenly aware of the need to increase activity in the Space Life Sciences. It is essential that the Space Life Sciences keep pace with the other NASA activities which depend on Life Sciences. For that reason the Committee is committed to fully funding this program area in fiscal years 1990 through 1992.

The Committee expects that the budget growth in the next three years will be accompanied by expanded involvement of the private sector and academic communities with more frequent announcemets of opportunity. This type of extramural research is an essential element in obtaining vigorous, competitive, high level of research. The program will profit greatly by increased levels of participation from the private and academic communities. The Committee directs NASA to increase this level of activity and also encourages NASA to give special consideration to techniques which will accommodate and encourage consortia of private and/or academic groups which successfully pool resources that are advantageous to NASA.

Lifesat

The Lifesat program, an ELV launched, 30–60 day on-orbit recoverable satellite, will provide the capability to obtain precursor biological and medical space flight data in preparation for building a permanent presence in space. In addition, Lifesat will provide low cost access to space for micro-gravity experiments and other shuttle secondary payloads when crew presence is not required. The Committee has previously noted its concern about the limited number of near-term space flight opportunities for such payloads (House Report 100–204, p. 113). The Committee strongly supports the need for this capability and urges NASA to make Lifesat a FY 1991 new start.

Planetary exploration

President's request:	
Fiscal year 1990	$396,900,000
Committee recommendation:	
Fiscal year:	
1990	361,900,000
1991	322,000,000
1992	278,000,000

Committee authorization recommendation

Section 4(1)(E) authorizes appropriations of $361,900,000 for fiscal year 1990 for Planetary Exploration activities. This is $35,000,000 below the President's request. This reduction is based on the transfer of funds to create two new line items: $5,000,000 for Space Exploration; and, $30,000,000 for Comet Rendezvous Asteriod Flyby/Cassini (CRAF/Cassini) program. Authorization for the Space Exploration program provided is in Section 4(1)(L). Multiyear authorization for CRAF/Cassini is provided in Section 4(1)(P). This mul-

tiyear authorization allows for $30,000,000 in outlays for CRAF/Cassini in fiscal year 1990.

Section 4(1)(E) also authorizes the appropriation of $332,000,000 for fiscal year 1991 and $278,000,000 for fiscal year 1992 for Planetary Exploration activities. The authorization for fiscal year 1991 is based on an Administration baseline of $470,000,000 with a reduction of $148,000,000 which is transferred into Sec. 4(1)(P) for CRAF/Cassini. Similarly, the authorization for fiscal year 1992 is based on an Administration baseline of $591,000,000 with a reduction of $313,000,000 which is transferred into 4(1)(P) for CRAF/Cassini.

Program description

The Planetary Exploration program encompasses the scientific exploration of the solar system including the planets, their satellites, comets, and asteroids and the interplanetary medium. The Committee notes that this program not only increases our understanding of the nature and evolution of other planets in the solar system, but it furthers our understanding of the origin and evolution of life on earth.

In FY 1990 two new planetary missions will be launched. Galileo will be launched on a Shuttle-Inertial Upper Stage (IUS). Ulysses is a joint NASA and European Space Agency (ESA) activity. The mission will carry a package of experiments to investigate the Sun at high solar latitudes that cannot be studied from the Earth's orbit. This comprehensive science payload will extend our knowledge of Jupiter and its system of satellites well beyond the discoveries of the Voyager and Pioneer missions.

Magellan, launched in FY 1989, will arrive at Venus in August 1990 and begin global mapping of the cloud shrouded surface of Venus. A synthetic aperture radar will penetrate the atmosphere and provide sufficient resolution to identify small scale features that will allow us to address fundamental questions about the origin of the planet.

Development continues on the Mars Observer mission which will study the geologic and climatic evolution of the planet Mars after its launch in FY 1992.

FY 1990 will begin a new science start, the Comet Rendezvous Asteroid Flyby (CRAF) and Cassini (the Saturn Orbiter/Titan Probe) missions planned for launch in 1995 and 1996 respectively. Both missions will provide new understanding of the origin of the solar system and may provide new clues to the origin of life as well.

FY 1990 funding will be required for the continued operation and data analysis activities in support of the Pioneer and Magellan missions as well as for Voyager on its interstellar trajectory. FY 1990 funding for the Galileo mission provide for the completion of integration of the spacecraft with the Intertial Upper Stage in preparation for a launch early in FY 1990.

Committee views

The Committee has expressed its disappointment that NASA has been unable to provide a budgetary line item for the Observer program in the same fashion as the highly successful Explorer program in Astrophysics. The Committee maintains that this would

likely bring about a more effective program, one that allows for continuous predictable development which will help to keep costs down while maintaining continuous scientific progress. However, the Committee also recognizes that the current environment for carrying out planetary exploration is far different than that in which the Observer program was originally conceived.

First, as a result of lessons learned in the Mars Observer program, future Observers may profit from a modified approach to procurement and project planning. This should be taken into consideration when reassessing the existing strategy for solar system exploration.

Also, the President has called for expansion of human presence in the solar system. This places a new onus on the Observer program since the call to expand human presence will require information gathered by the Observers to provide a scientifically and technically sound basis for assessing the options for human expansion.

Finally, in order to achieve the expansion of human presence, the Committee believes that this will require a higher level strategy for international cooperation. A contemporary strategy should recognize possible contributions of other nations, and promote a constructive program that will enhance cooperation among spacefaring nations.

In view of these factors, the Committee requests that NASA reassess the validity of the strategy for future solar system exploration developed by the Solar System Exploration Committee (SSEC), the advisory group which recommended a comprehensive program of missions to the inner and outer solar system.

The Committee notes that NASA has already committed to undertaking this reassessment of the strategy for solar system exploration. The Committee is looking forward to viewing the results.

Section 4(1)(F) Space applications

President's request:	
Fiscal year 1990	$579,700,000
Committee recommendation:	
Fiscal year:	
1990	646,000,000
1991	552,000,000
1992	518,000,000

Committee authorization recommendation

Section 4(1)(F) authorizes appropriations of $646,000,000 for fiscal year 1990 for Space Applications activities. This is $66,300,000 above the President's request. This recommendation reflects the funding commitment to the following program areas:

The Committee authorizes the full baseline amount of $434,300,000 for the Earth Science program area. The Committee in recognizing the potential serious implications of global change, strongly supports the effort to gather relevant data to support more accurate predictions of global change. The Committee directs the NASA Administrator to ensure that adequate efforts are undertaken in preparation for the Mission to Planet Earth. This initiative will bring together the scientists of many nationalities. It will be a cooperative venture of inter-

est to many different governments. The international character of the preparations will provide an excellent contribution to the 1992 International Space Year.

The Committee authorizes the full amount of $92,700,000 for the Materials Processing program area.

The Committee authorization of $84,900,000 for the Space Communications program area reflects an augmentation of $66,300,000 over the baseline to restore the Advanced Communications Technology Satellite (ACTS) program. This augmentation consists of the following: $61,500,000 is for the ACTS development which includes one prototype, one master control, and one closed loop link system evaluator terminal; $2,800,000 for funding of experimentor research; and $2,000,000 for the purchase of experimental ground station hardware. The availability of the $2,000,000 is predicated upon matching funds being made available by cosponsors from the private sector.

The Committee authorizes the baseline amount of $34,100,000 for the Information Systems program area. The Committee is in full support of NASA's recognition of the critical new role information systems will play in our utilization of space science data. The increases the Administration has requested in this area over the request for last year are apropriate and reflect NASA's appreciation of the importance of this space generated data.

Section 4(1)(F) also authorizes the appropriations of $552,000,000 for fiscal year 1991 and $518,000,000 for fiscal year 1992 for Space Applications activities. The authorization for fiscal year 1991 is based on the Administration baseline of $518,000,000, the addition of $32,000,000 for Communication program area activities and the addition of $2,000,000 for Information Systems program area activities. The authorization for fiscal year 1992 is based on the Administration baseline of $500,000,000 the addition of $14,000,000 for Space Communications program area activities, and the addition of $4,000,000 for Information Systems program area activities.

In the Space Communications program area for fiscal year 1991, the augmentation over the baseline request consists of the addition of $28,000,000 to continue the ACTS program, $2,000,000 to fund experimental ground station research, and $2,000,000 for the purchase of ground station hardware. For fiscal year 1992, the augmentation over the baseline request consists of the addition of $10,000,000 to continue the ACTS program, $2,000,000 to fund experimental ground station research, and $2,000,000 for the purchase of ground station hardware. The availability of the $2,000,000 for purchase of ground stations in fiscal years 1991 and 1992 is predicated upon matching funds being made available by cosponsors from the private sector. The Committee estimates that the cofunding, together with this authorization, should provide sufficient funds for approximately 100 ground stations.

In the Information Systems program area for fiscal year 1991, the augmentation over the baseline request consists of the addition of $2,000,000 and $4,000,000 for fiscal year 1992. These increases reflect the Committee's recognition that the many new space science missions launched between 1989 and 1992 will place an increased burden on current facilities for the archiving and distribution of

data. Cost estimates for NASA data archiving have been seriously underestimated in the past. The Information Systems program will require additional funding to support the expectations of NASA and the needs of the space science community.

Program description

Space Applications program includes the Earth Science and Applications program, Materials Processing in Space program, Communications program, and the Information Systems program.

Earth Science and Applications will continue the development of various advanced instruments needed to support a wide variety of interdisciplinary studies on atmospheric dynamics, ocean processes, radiation, upper atmosphere/troposphere chemistry and land-based processes. These instruments will provide the urgently needed data to verify models of earth processes and increase our understanding of critical global issues.

The Microgravity Science and Applications program will focus on definition studies for Shuttle and Space Station experiment candidates in areas such as containerless experiments, solidification and crystal growth and processing of biological materials.

In the Advanced Communications program area, special emphasis is being given to technologies with high potential for improving frequency spectrum utilization, satellite switching, and intersatellite link technologies since these technologies are key to the future growth of the communication satellite and terminal markets.

In FY 1990, the Information System program will continue to provide advanced computer and information systems technology to support the OSSA science program. Included in Information Systems program is a new emphasis on space science data management and archival support to provide the OSSA community with a faster, more reliable system to assimilate, archive, and distribute data. With the return of the Shuttle to operational status, the amount of space generated data is increasing tremendously. FY 1990 funds will be used to augment and restructure data management and archival programs.

Committee views

Advanced Communication Technology Satellite (ACTS)

The Advanced Communication Technology Satellite (ACTS) represents the culmination of many years of key technology developments in the field of advanced communication satellite systems. It is critical to our interest in retaining and expanding our competitiveness and protecting our leadership in the world of commercial communications. The ACTS program is critical to demonstrating and nurturing in our universities and private sector research centers, the knowledge base for development of complex electronic architectures needed for tomorrow's state-of-the-art space communications. The Committee fully supports ACTS and was disappointed to find that funding for it was not included in the FY 1990 budget request. The program is over 75 percent complete; nearly $400,000,000 has been invested in it, and even more is at stake.

Technology development by NASA over the past five years has established the plausibility of ACTS spectrum-conservative technol-

ogy innovations for satellite communication systems of the future. The original idea behind the ACTS program was to place the new technologies in the hands of as many experimenters as possible so that the potential for commercial development could be fully exploited and the process of introducing new technology accelerated. Therefore, it is now appropriate to begin the construction of many experimental ground stations in association with the ACTS flight demonstration. Ground stations should be made available to the researchers who can find matching funds to develop applications for the ACTS system. The Committee encourages the maximum use of private sector infrastructure.

The Committee intends that title to the cosponsored ground terminal equipment, purchased under this section, shall be turned over to the private sector for the purpose of continued utilization.

By providing authorization, as described in Section 4(1)(F), for funding in fiscal years 1990, 1991, and 1992 for the ACTS program, the Committee has signalled its determination to complete the development of this advanced communication system. Furthermore, because it is essential that the implementation of the advanced communications technology requires active participation from the private sector, funding for ground station hardware has been predicated on the cosponsorship by the private sector. It is the intent of the Committee that the ACTS program will foster an active and viable user community which will drive the implementation of ACTS through the development of associated applications. By promoting the Government-private sector partnership in ground station development, the Committee intends that the U.S. will gain a lead in marketing ground station equipment worldwide.

U.S. interests in High Definition Television (HDTV)

A concurrent interest of the Committee is the rapid and competitive development of technologies for High Definition Television (HDTV). The existing technology in communication satellites is not capable of serving HDTV. The ACTS program provides the perfect test bed for developing the distribution medium for HDTV. In order to remain competitive in the commercial world market for HDTV, it is necessary to develop not only the HDTV display technology but also the complete distribution system. This technology will be developed more rapidly if the options made possible by ACTS are available.

It is very clear that the communication system which is meeting our needs today, will not continue to do so in the future. The volume of communications in the very near future will swamp the capacity of available frequency bands. The ACTS technology allows more intensive use of the frequency spectrum. The applications are numerous. Despite the compelling commercial reasons for its development, ACTS technology is beyond the reach of a single private communications corporation. The government must play a role when what is required is an industry wide change of standard.

The Committee, therefore, directs NASA to seek experimental users of ACTS that will focus on HDTV developmental aspects. These efforts will provide a valuable and unique component of the overall Federal effort to maintain a competitive posture in the emerging HDTV market.

The Committee expects high definition television (HDTV) to become a technology which will revolutionize the way people view and use information transmitted from remote locations. The National Aeronautics and Space Act requires public dissemination of information from space, using updated industry standards and practices, which the Committee expects will include HDTV and other forms of advanced television by the mid-1990's. HDTV may also assist in the safe operation of space vehicles, the activities of the Space Station, and medical diagnosis of crew members, where the transmission of accurate remote television images is necessary. Basic HDTV research, and development of HDTV cameras, displays, and methods for digital signal processing and transmission, is important for NASA to carry out its mission. Therefore, the Committee recommends that NASA encourage the development of HDTV components and techniques, and incorporate them into the Space Station and other programs, as these components and techniques become available.

Global change program—Earth Observation Satellites (EOS) and Earth Probes

The Committee believes that it is a vital interest of the United States to carry out comprehensive investigations into the threat of global changes in the earth environment as a result of the activities of man. This is a pursuit which will help us to protect and preserve our environment, it benefits all of mankind, it maintains the U.S. image as a leader in technological issues, and what's more, this activity is fully supported, if not mandated, by the public. No stronger set of reasons could be assembled for any action by the government.

The Committee also believes that NASA has a prominent role to play in this enterprise. The Committee would like to see NASA reserve the highest priority of the FY 1991 budget to earth science projects among all new starts.

The Committee regrets that the first of the Earth probes is not included in the FY 1990 budget submission. This Earth Probe was to have carried the Total Ozone Monitoring Spectrometer into low-earth orbit. Recent discovery of disturbing losses of the ozone in the vicinity of the North and South poles have made it clear that we must continue to monitor this chemistry closely until we fully understand all of the processes which are leading to ozone loss and can fully anticipate the implications to life on earth. Currently, the only source of systematic satellite based ozone monitoring is by the Nimbus 7 satellite. This satellite is expected to fail at any time. Once this satellite is lost we will be without a valuable component to our baseline ozone monitoring capability.

The Committee feels that the omission of the first of the Earth probes in the FY 1990 budget submission, makes little sense in terms of the clear urgency of our need to monitor world ozone levels and our proclaimed intention to study Global Change. Therefore, the Committee requests that NASA initiate an Earth probes program in FY 1991 and launch the next TOMS instrument as soon as possible in order to provide an ozone record for the Global Change program. Meanwhile, the Committee would like to be kept fully abreast of efforts to place a TOMS instrument on a Soviet sat-

ellite and informed of the effectivness of the transmission of data from that instrument back to U.S. researchers.

In a similar vein, the Committee directs the Administration to preserve and protect all of the launches of earth science projects, especially those like Atlas-1, GOES-I and -J, LAGEOS-11, POES-D and POES-I, SEAWIFS (on LANDSAT-6), UARS and WAMDII which represent an assortment of earth science projects which will play a major role in our readiness for the International Space Year in 1992.

Section 4(1)(G) Technology utilization

President's request:	
Fiscal year 1990	$22,700,000
Committee recommendation:	
Fiscal year:	
1990	22,700,000
1991	23,400,000
1992	21,200,000

Committee authorization recommendation

Section 4(1)(G) authorizes $22,700,000 for Technology Utilization activities in fiscal year 1990: This is equal to the amount contained within the President's request. Section 4(1)(G) also authorizes the appropriation of $23,400,000 for fiscal year 1991 and $21,200,000 for fiscal year 1992 for Technology Utilization activities. These authorization levels are equal to the Administration baseline estimate.

This year, the Committee examined the public benefits resulting from investments made in the civilian space program. Technology spinoffs in the fields of health and medicine, education, agriculture, energy, public safety and transportation were the subjects of a hearing April 13, 1989. The transfer and application of aerospace technology resulting from NASA's R&D programs is accomplished primarily through NASA's technology utilization program. NASA accomplishes this through various technology transfer mechanisms which provide timely access of technology to the public and private sector.

Program description

The specific objectives of the technology utilization program are:

To accelerate and facilitate the application of new technology into the commercial sector, thus shortening the time between the generation of advanced aeronautics and space technologies and their effective use in the economy;

To encourage multiple seccondary uses of NASA technology in industry, education, and government, where a wide spectrum of technological problems and needs exist;

To develop applications of NASA's aerospace technology, including its unique facilities, to prioritize non-aerospace needs of the Nation.

Committee view

Management of the Stirling Engine Program

The Stirling engine may eventually contribute to a long-term solution to the nation's emission problems and represents a strategic

alternative for pollution abatement. Research and development in Stirling technology suggest the logical next step for the Stirling is a commercial demonstration of the engine which would place into the hands of end-users multiple Stirling units for field tests. Supporters of the Stirling engine have proposed a government and industry cost-sharing demonstration program.

For the last decade, the federal government has funded a Stirling engine research, development, and demonstration program, with DOE providing $130 million and NASA only $0.9 million. Because of its expertise in combustion technology, NASA managed the Stirling program on behalf of DOE. There is a strong consensus that the automotive Stirling engine has matured beyond the R&D stage. Therefore, DOE has decided to terminate its Stirling engine R&D program and has not requested any funding for it in FY 1990.

For the last 4 years, NASA has funded a $900,000, 3-vehicle demonstration program. It has been suggested that full sponsorship of the Stirling engine program be transferred from DOE to NASA. The Committee is uncertain whether transferring agency sponsorship would be in the best interests of Stirling engine development and commercialization.

To determine the optimal long-term sponsor for the Stirling engine, the Committee directs NASA to participate in an interagency study including the Department of Energy, the EPA, and the Air Force, in consultation with other interested agencies, to evaluate potential sponsorship of such a program. The study should include the optimal size and scope of the demonstration fleet, a determination of the private sector contribution, and a mechanism for securing such funds. The Committee encourages NASA to consult with the private sector in developing the study plan. The study should be submitted to the Congress by February 1, 1990.

Section 4(1)(H) Commercial use of space

President's request:	
Fiscal year 1990	$38,300,000
Committee recommendations:	
Fiscal year:	
1990	40,300,000
1991	59,700,000
1992	92,450,000

Committee authorization recommendation

Section 4(1)(H) authorizes $40,300,000 for commercial use of space activities in FY 1990. The Committee's recommendation reflects an increase of $2,000,000 over the President's request to be allocated as follows: a down payment of $1,000,000 leading toward a NASA commitment to lease SPACEHAB modules to provide expanded flight research opportunities for commercial users of the Space Shuttle; and $1,000,000 authorized to establish the seventeenth new Center for the Commercial Development of Space (CCDS), in Education. Such a Center is intended to facilitate the use of space and communications technology in the field of education.

Section 4(1)(H) also authorizes $59,700,000 for FY 1991 and $92,450,000 for FY 1992. The FY 1991 authorization is based on a baseline estimate of $52,600,000 and the addition of $6,100,000 for the lease of SPACEHAB and $1,000,000 for Education CCDS. The

FY 1992 authorization is based on a baseline estimate of $51,600,000 and the addition of $39,850,000 for the lease of SPACEHAB and $1,000,000 for the Education CCDS.

In addition to supporting the President's budget request for commercial use of space, the Committee's authorization recommendation for the next three fiscal years will provide for use of SPACEHAB, a commercially financed facility that will enhance the capability of the Space Shuttle by doubling the existing Orbiter habitation volume and quadrupling the volume available for man-tended space experimentation. Specifically, the Committee's authorization will provide for NASA use of one and one-half flights of SPACEHAB through 1992, to include: one half of the first flight of SPACEHAB in January 1992; all of the second flight of SPACEHAB in September 1992; for 1992 and beyond, funding is provided for NASA use on an average of two SPACEHAB flights per year. Fiscal year 1991 and 1992 funding estimates envision that government payments for integration activities related to SPACEHAB use will be made in advance of launch. Payment for lease will be paid post-launch. Payment plans include barter arrangements whereby SPACEHAB will swap lease costs for Shuttle transportation costs. The Committee has encouraged NASA to utilize barter agreements and other creative means of encouraging the growth of privately developed space hardware and services. Purchase by NASA of commercially provided space products and services to meet NASA requirements or other established needs has been seen as offering distinct advantages to NASA and the nation, including enhanced competition, lower costs and the availability of new and alternative technologies, products and capabilities. As specially recognized in the FY 1989 NASA Authorization Report, (H. Rept. 100–650) barter agreements, whereby launch service costs are waived in exchange for government use of commercially provided hardware or services, is a particularly important means of bringing on line Shuttle associated products and services, such as SPACEHAB, that can provide new capabilities for government and commercial markets.

The Committee's authorization of $1,000,000 in fiscal years 1990, 1991, and 1992 supports the establishment of the seventeenth new Center for the Commercial Development of Space, in the field of education. Such a Center should facilitate the mobilization of space and communications technologies to address the educational needs of this nation.

Program description

NASA's Commercial Use of Space program is intended to provide a national focus for expanding U.S. private investment and involvement in civil space activities.

The objectives of the Commercial Use of Space program are:

Establish close working relations with the private sector and academia to encourage investment in space technology and the use of the in situ attributes of space—vacuum, microgravity, temperature and radiation for commercial purposes.

Facilitate private sector space activities through improved access to available NASA capabilities and the development of new high technology space ventures and markets.

Encourage an increase in private sector investment in the commercial use of space independent of NASA funding.

Develop and implement commercial space policy NASA-wide.

Committee views

Office of Commercial Programs as focal point for commercial space policy

The National Aeronautics and Space Administration Authorization Act, 1985, Public Law 98–361, amended the National Aeronautics and Space Act of 1958 to require that the agency "seek and encourage, to the maximum extent possible, the fullest commercial use of space". This fundamental change to NASA's mission accompanied a Congressional directive that NASA should aggressively pursue all areas of potential commercialization. Shortly thereafter, the Administrator established and designated the Office of Commercial Programs as the focal point for commercial space programs and policy. These activities are fully consistent with and were intended to address the dynamic competitive environment that has evolved over the past 25 years.

Upon the fifth anniversary of the establishment of the Office of Commercial Programs, NASA has not yet focused commercial space policy within the Office of Commercial Programs. The goal of the program is to engender commercial space activity throughout the agency. However, commercial space policy organization and activities continues to be diffused within the agency. For example, the Office of Commercial Programs was not involved in either the development or explanation of seven "commercialization initiatives" involving private financing in the fiscal year 1990 budget request. Nor has the office been involved in the development of a greater commercial orientation for NASA as a procurer of space launch services and other space related services. This situation will inevitably result in policy inconsistencies that will seriously undermine the confidence of the private sector and discourage long-range investments in space.

The Committee feels that ultimately, the agency cannot be successful in carrying out a commercial mission so long as the purview of the Office of Commercial Programs is limited to a single program whose primary emphasis over the years has been materials processing. The Committee fully expects NASA's commercial orientation and activities to be bolder and more aggressive, ranging from facilitating commercial users of space hardware and services, to fostering the government's evolution as a customer of commercial space services and hardware. In order for this to happen, the budget, authority and responsibility of the Office of Commercial Programs must be substantially increased, and pervade all aspects of the agency's activities. This would place the office in a better position to influence NASA-wide, and government-wide, thinking and acting on commercial space matters. Such a change would also signal an important and needed commitment to NASA's commercial space mission.

Commercial flight opportunities

The Committee views use of SPACEHAB as an important means of providing flight experiment opportunities for commercial users into the next decade. SPACEHAB modules fit into the payload bay of a Shuttle Orbiter, and enhance the capability of the Space Shuttle by doubling the existing Orbiter habitation volume and quadrupling the volume available for man-tended space experimentation. The Committee views committed use of the SPACEHAB module as a valuable and near-term means for providing increased opportunities to the secondary, commercial payload community. Such aggregation of these smaller, commercial microgravity payloads into the SPACEHAB module facilitates commercial flight experimentation through an enhanced status as a primary payload. A particularly attractive feature of SPACEHAB use is the customer's ability to obtain late access to a flight opportunity. Unlike Spacelab, which requires experiment integration three years in advance, SPACEHAB requires customers' hardware integration only 5 months in advance, with some flight integration accommodation possible only 12–15 hours prior to launch.

The Committee views NASA use of SPACEHAB as a means of according flight priority to the commercial payload community which is fully consistent with NASA's mission to foster the commercial use of space.

The Committee fully intends that NASA embark on an aggressive program of commercial research flight opportunities designed to position the industrial sector to utilize flight opportunities presented by permanent manned presence in space in the next decade. To this end, the Committee has included language to amend the National Aeronautics and Space Act to enumerate two new authorities of the NASA Administrator consistent with his responsibilities under the Act to "seek and encourage, to the maximum extent possible, the fullest commercial use of space". Expanding on activities already being undertaken at NASA to promote commercial activity in space, the language directs the Administrator to enhance the Administration's capabilities by procuring space hardware and services from the private sector *as well as* extending their use for government and commercial customers in furtherance of the agency's mission to seek and promote the commercial use of space. The new language clarifies that the Administrator has additional authority to expand commercial activity in space by establishing procedures for the procurement of space hardware and services available from the private sector, and for use of the Administration's facilities and services and associated commercial facilities and services. Further, the language complements the discretion accorded the Administrator pursuant to Title II of the National Aeronautics and Space Administration Authorization Act of 1986, Public Law 99–170, establishing a Shuttle pricing policy for commercial and foreign users. Section 204 of that Act directs the Administrator to establish and implement a pricing system for commercial users of the Space Shuttle in order to achieve the objectives of greatly increased commercial space activity and the enhancement of the international competitive position of the United States. The law further accords the Administrator discretion to set

incentive prices designed to involve commercial users in cooperative research, development and demonstration programs with NASA. The Committee fully intends that these commercial customers will graduate to a full paying status once commercial research activities result in commercial product production. Thus, the new language recommended by the Committee expands on these prior authorities to make plainly clear that NASA use of commercially provided facilities and services, on behalf of government and commercial users, is clearly appropriate and consistent with the commercial mission assigned to it in 1983.

Center for Commercial Development of Space in Education

The Committee enthusiastically recommends an authorization of $1 million to establish a Center for Commercial Development of Space in Education. Such a center should facilitate the mobilization of space and communications technologies to address the educational needs of this country. NASA currently funds sixteen Centers for the Commercial Development of Space in such areas as space propulsion, biotechnology, materials processing and space remote sensing. These centers, providing a focal point for consortia of industry and universities, are a significant conduit for space commercialization activities. Since the Commercial Development of Space Center concept was initiated by NASA several years ago, industry matching funds have grown to exceed government funding by 3 to 1. A new center in education would tap the talents and technologies of the private sector to be brought to bear on the educational needs of the nation. Schools nationwide would in turn be able to seek information from such a center on new space-based capabilities for teaching and instruction.

The Committee's recommendation for a new, seventeenth center in the field of education reflects its enthusiasm for the Centers for Commercial Development of Space as a model for commercial space development involving minimal government support. NASA grants to support the Centers, and the agency's supporting role of technical and management consultant, is minimal. Universities and industries working together and combining investments and other resources have demonstrated that the development of commercial opportunities in commercial research can be accomplished efficiently with minimal government involvement. For example, on March 29, 1989 the CCDS for Space Materials Development at Huntsville, Alabama successfully launched six CCDS developed payloads on a commercially provided launch vehicle, at a cost of $1.4 million. The effort involved eight U.S. companies, two other CCDS Centers and three universities. The entire effort, to integrate the payloads and procure the launch services, conduct the launch and recover the payloads, took only 9 months. The Committee intends that the CCDS concept will be continued as a dynamic means of stimulating the commercial development of space.

External tanks

The Committee commends NASA for working with a consortium of universities and the private sector to promote commercial uses of jettisoned shuttle external tanks. As NASA stated in testimony before the House in February of this year and again in April, it has

signed a Memo of Agreement with the University Corporation for Atmospheric Research (UCAR) granting them use of five external tanks on a suborbital basis.

The Committee believes this collaborative effort between government, universities, and the private sector to develop the use of external tanks will improve U.S. productivity and international competitiveness in the years ahead.

The Committee urges NASA to look beyond the suborbital use of jettisoned tanks toward an early demonstration of their use in orbit, thus bringing even greater value to this element of the space shuttle system.

Section (4)(1)(I) Aeronautical and Transatmospheric research and technology

President's request:	
Fiscal year 1990	$589,800,000
Committee recommendation:	
Fiscal year:	
1990	589,800,000
1991	621,000,000
1992	603,000,000

Committee authorization recommendation

Section 4(1)(I) authorizes appropriations of $589,800,000 for fiscal year 1990 for Aeronautical Research and Technology and Transatmospheric Research and Technology. This amount is identical to the amounts in the President's request for these programs. The authorization also provides that none of these funds may be expended until $127,000,000 is made available for the National Aero-Space Plane program, either as a result of action by the Appropriations Committee or by reprogramming by NASA from any other account.

Section (4)(I) also authorizes the appropriation of $621,000,000 for fiscal year 1991 and $603,000,000 for fiscal year 1992. These amounts are identical to the levels in the Administration's baseline estimate.

Program description

The purpose of the aeronautics research and technology program is to address the critical issues associated with the U.S. air transportation system, to enhance American competitiveness in the international marketplace, and preserve the country's preeminence in aviation for national security. Technologies are being pursued which, when fully implemented, could offer major advances in vehicle performance and capabilities and which could provide substantial positive impact on U.S competitiveness. Research efforts have been expanded in high payoff areas associated with a broad range of future vehicle applications including high-performance aircraft, and high-speed transport aircraft. The demands for NASA's unique wind tunnels are continuing to increase with the emergence of new civil and military aircraft programs. In order to ensure wind tunnel availability to meet these demands, a major five-year revitalization program was initiated to modernize NASA's major wind tunnels for productive use well into the next century. This revitalization program is entering its second year in FY 1990.

The transatmospheric research and technology program is a portion of the joint NASA/Department of Defense (DOD) National Aero-Space Plane (NASP) program. FY 1990 is the last year in the NASP Phase 2 program plan and will establish the technology base for the decision in the last quarter of calendar year 1990 as to whether to proceed to Phase 3 which is the design, construction, and flight testing of the X–30.

Committee views

Aeronautical research and technology

The Committee is pleased that NASA and the Administration have begun to recognize the situation with regard to foreign competition in the world aviation market that has emerged during the 1980's. For example, during the 1970's, the U.S. share of worldwide jet transport orders, the largest component of aerospace exports, was 84 percent. During the 1980's, this measure stood at 76 percent, largely reflecting a strong challenge from European aircraft manufacturers.

This trend clearly indicates the U.S. must run harder if it wishes to remain competitive in the aviation market, one of the few remaining sectors with a net positive balance of trade. Improved technology will be a key element in this effort. Breakthroughs in performance have always been the sought-after goal that could change the outcome in air warfare situations or commercial competitions. The United States is preeminent in both areas today largely because unheralded researchers in NASA and DOD laboratories, working with small amounts of money, have found those breakthroughs. Revolutionary advances such as the area rule for supersonic flight, the tilt rotor and the prop fan have profoundly changed aviation. Yet the basic work that led to the ideas was achieved at very low cost.

The Committee believes the level of basic aeronautical research must be enhanced. The FY 90 request is a positive step in that direction: but greater investments will be needed if the U.S. is to maintain its preeminent position in aviation.

National Aero-Space Plane

The Committee strongly supports the Aero-Space Plane research project as a necessary precursor to potential applications, such as a follow-on to the Space Shuttle, which will be needed in the late 1990's. Furthermore, the Committee believes the scientific fallout, in areas such as high temperature materials and cryogenic fuels production and use, will pay huge dividends, not only in terms of continued U.S. leadership in both space and aeronautics, but in many other fields.

The Committee is concerned that programmatic and budget changes announced by the President may undermine the heretofore substantial commitment of funds by U.S. industry. Without such investment the project is unlikely to be successful. Accordingly the Committee directs NASA to participate with the Air Force in an Armed Services Committee study on the feasibility and cost savings of accelerating the flight vehicle decision by one year from the original schedule.

Furthermore the Committee wishes to emphasize the importance of focusing on the research goals of demonstrating single state-to-orbit operation and hypersonic cruise in the atmosphere. Nice-to-have operational add-ons can only serve to increase program costs and lessen the chances of success.

Construction of facilities

The Committee notes that many of NASA's wind tunnels are old, having been constructed in the 1940's and 50's. Furthermore, the rate of investment in rehabilitation and modernization has been about one percent of the replacement value per year, compared with the industry standard of about five percent. The result is a potentially serious situation involving structural failures, long testing delays, and safety problems. A particularly serious example is the 12-Foot High-Pressure Tunnel at Ames, which has been decertified because of numerous cracks in the pressure shell, a limitation that its many industrial military users find intolerable.

NASA commissioned a special task force to make a comprehensive assessment of the state of health of its major wind tunnels. The task force found a total of 19 wind tunnels that are in need of rehabilitation and modernization, and recommended a 5-year, $260 million program. The FY 90 request for $71.1 million represents the second year of this plan, which is directed toward rehabilitating the 12-foot pressure wind tunnel at Ames, the 8x6 Supersonic and 9x15 low-speed wind tunnels at Lewis, the hypersonic tunnels at Plum Brook and Langley, as well as additional wind tunnel rehabilitations at these facilities.

The Committee believes NASA's wind tunnels are a national asset critical to maintaining preeminence in aviation and strongly supports the need to refurbish them. It recommends the full request.

Aviation safety research

The Committee urges the Administrator to work jointly with the Administrator of the Federal Aviation Administration to conduct long-range aviation safety research projects. The Aviation Safety Research Act of 1988, Public Law 100–591, mandates that FAA establish a long-range research program. The Act requires that FAA develop a research plan and include complementary and coordinated research efforts with NASA. The research areas to be explored include aviation fire safety, aircraft maintenance and human factors.

The Aviation Safety Research Act originated in the Committee and was passed without opposition. FAA does not currently have a long-range research program with both the level of effort and the level of funding that NASA does. Consequently, the Committee believes that the two agencies should work jointly, as required in the Act, to resolve aviation safety research issues and to develop a stronger FAA long-term research program.

Assurance assessment

NASA is directed to investigate the feasibility of utilizing assurance assessment technology, and report the results to the Committee on Commerce, Science, and Transportation by January 20, 1990.

Aeronautical materials development

The Committee notes that NASA's Langley Research Center awarded contracts in May, 1989, to 15 applicants that could total $89.17 million under its five to six year Advanced Composite Technology (ACT) initiative.

The Committee also notes that the Air Force's Research and Development Center at Wright Patterson Air Force Base recently granted two $13 million-plus contracts for the two-year second phase of its Design and Manufacture of Advanced Thermoplastic Structures (DMATS) program.

As both programs are dedicated to developing advanced non-metallic structures technology, the Committee is concerned that there not be a duplication of effort.

The Committee believes there are new metallurgical opportunities which, if exploited early, would provide benefit to the commercial aviation industry and enhance its position in international competition.

In this regard, the Committee directs NASA to coordinate with the Air Force's R&D Center so as to ensure that unique, original and needed research is done by each.

The Committee also understands that at least $53 million in ACT funding may be available and directs NASA to provide a balanced share for advanced metallic aeronautical materials technology development and productivity enhancements. By funding composite technology and not metallics technology, the government artificially promotes one material over the other.

Section (4)(1)(K) Space research and technology

President's request:	
Fiscal year 1990	$338,100,000
Committee recommendation:	
Fiscal year:	
1990	358,100,000
1991	487,000,000
1992	530,000,000

Committee authorization recommendation

Section 4(1)(K) authorizes appropriations of $358,100,000 for fiscal year 1990 for Space Research and Technology activities. This is $20,000,000 above the President's request. This increase is the net result of: a $5,000,000 increase to support an aggressive program of research and technology development to enhance the performance and reduce the cost of expendable launch vehicles developed by the private sector; a $25,000,000 increase in the Pathfinder program; and a reduction of $10,000,000 reflecting the transfer of funds in an equal amount to the new Space Exploration budget line item—Section 4(1)(L).

Section 4(1)(K) also authorizes the appropriation of $487,000,000 for fiscal year 1991 and $530,000,000 for fiscal year 1992 for Space Research and Technology activities. The authorization request for fiscal year 1991 is based on an Administration baseline of $430,000,000 and the addition of $7,000,000 for expanded research and technology development in support of the expendable launch vehicles developed by the private sector and $50,000,000 for enhancement of the Pathfinder program. The authorization request

for fiscal year 1992 is based on an Administration baseline of $420,000,000 and the addition of $10,000,000 for expanded research and technology development in support of the expendable launch vehicles developed by the private sector and $100,000,000 for enhancement of the Pathfinder program.

Program description

The overall goal of the Space Research and Technology is to provide advanced, enabling technologies, validated for user-readiness for future space missions, in order to ensure continued U.S. leadership in space to meet national needs. To achieve this goal, a commitment is required to provide a broad base of advanced technology for vehicle and subsystem concepts, components, devices, and software; to develop technology strengths in the engineering disciplines within NASA, industry, and academia; and to perform critical technology demonstrations that facilitate the transfer of new technology with a high level of confidence to future space missions.

Committee views

Management instability

The Committee is deeply concerned about the extent of instability that has existed for many years within the senior management ranks within the Office of Aeronautics and Space Technology (OAST) at NASA Headquarters. As an example of this instability, one witness told the Committee that during the past 20 years, OAST has been headed by a total of 21 Associate Administrators. This level of turnover is clearly excessive and unacceptable.

The Committee believes that this high level of turnover is part of the reason that the OAST budget has declined so dramatically since the mid-1960s. As evidence of this relationship, the Committee notes that during the most recent period of time that the Space Research and Technology budget was experiencing some growth, OAST was headed by an Associate Administrator who had been in that position for almost three years (one of the longest spans in the history of NASA). When this individual left the Agency, the Space Research and Technology budget again began to slip.

The Committee believes that the activities that are supposed to be conducted within OAST are among the most important in the entire Agency. Indeed, this office is chartered with the responsibility for developing the cutting-edge technologies that are required to keep this country preeminent in space. These technologies, in turn, have been instrumental in providing countless dividends throughout the U.S. economy.

Accordingly, the Committee strongly recommends that current and future NASA Administrators be mindful of these concerns when choosing individuals to serve as the Associate Administrator of OAST. At a minimum, the Committee believes that before the Administrator appoints any individual to the post of Associate Administrator of OAST, the Administrator should obtain a commitment from that individual to stay on the job for at least 3 years.

Expendable launch vehicle research and development

The Committee's authorization includes a $5,000,000 augmentation in support of a strong NASA research and development effort in launch vehicle component technology. Following the NASA aeronautics research and technology program model, the Committee views such a relationship between NASA and the launch industry as critical to the Nation's efforts to compete in the international market for launch services. The Committee views such cooperation between NASA and industry as a significant means of facilitating the transfer of technology to the commercial sector. The benefits of such cooperation are expected to accrue to both the government and the private sector.

Pathfinder

The adequacy of NASA's investments in basic research and technology have been a matter of growing concern for a number of years. Since the 1960s, the percentage of NASA's budget that is devoted to Space Research and Technology endeavors has declined by about 50 percent.

In 1987, the National Research Council issued a report that was highly critical of NASA. This report stated:

> For the last 15 years, NASA's investment in basic research and technology development has been lower than the sustaining level required by most industries. The results are that the United States is losing its competitive lead in space, and new technology is unavailable to offer the nation a selection of future options in space.

In this regard, the Committee was disappointed with the size of the President's request for the Pathfinder program. This program is intended to provide answers during the early 1990s to the sorts of questions that have to be resolved if this country is going to decide to undertake major new missions to the Moon or Mars.

Managers within NASA determined that to meet this schedule, the Pathfinder program would have to be funded at a level of at least $200 million per year. Last year, the President requested $100 million to get the Pathfinder program underway, but this amount was subsequently cut by the Congress to $40 million.

This year, NASA originally sought $97.5 million in support for the Pathfinder program. However, by the time that the FY90 budget request was submitted to the Congress this amount had been reduced to only $47.3 million.

Recognizing the importance of this program to the future of the civil space program, the Committee restored half of the funding that had been deleted from the original NASA request.

The Committee strongly encourages NASA to heed the warnings that have been sounded by the National Research Council and others and, over the next five years, to double the percentage of the Agency's overall budget that is allocated to Space Research and Technology.

Section (4)(1)(L) Space exploration

President's request:
Fiscal year 1990 ..... ($20,000,000)

Committee recommendation:
Fiscal year:

1990	20,000,000
1991	35,000,000
1992	100,000,000

Committee authorization recommendation

Section 4(1)(L) establishes a new budget line and authorizes appropriations of $20,000,000 for fiscal year 1990 to support Space Exploration.

The $20,000,000 identified has been transferred from other accounts namely: $10M from the Pathfinder program, Space Research and Technology; $5M from Advanced Programs, Space Transportation Capability and Development; and $5M from Research and Analysis, Planetary Exploration. The funds are provided in order to continue studies of defining the next major manned goal of NASA. The transferred funds had already been targeted to support studies for Space Exploration.

Section 4(1)(L) also authorizes appropriations of $35,000,000 for fiscal year 1991 and $100,000,000 for fiscal year 1992 for Space Exploration.

Program description

The Space Exploration program is studying pathways for human exploration on a continuing basis and coordinating this activity among the other NASA programs. By coordinating these near-term activities the appropriate types of investments and programs can be pursued to enable a variety of pathways for potential future human exploration. Further, through the coordination of near-term activities, knowledge bases within the key NASA program areas are also being built which will permit a more informed decision regarding the eventual pathways to human exploration. These key program areas are:

(1) Space Station Freedom.
(2) Pathfinder.
(3) Life Sciences.
(4) Precursor Missions.
(5) Earth-to-Orbit Transportation.

The results of the FY 1988 studies are recorded in "Beyond Earth's Boundaries: Human Exploration of the Solar System in the 21st Century." This report gives a top level overview of potential exploration opportunities and options, as well as an assessment of the impact such opportunities might have on other NASA programs.

To organize and systematically examine the full spectrum of options, three strategies, or alternative pathways, were selected for study in 1988.

For each of the three exploration pathways, candidate missions were identified to be systematically examined as "case studies," in order to obtain an understanding of both near- and long-term implications of the potential approaches to exploration.

The strategies range from one-mission expeditions to long-term evolutionary programs. Some mission designs make use of existing technologies or those that will be available in the near future.

Others require highly sophisticated new developments that are only now under study. The strategies are:

Human expeditions, emphasizing a significant, visible, successful effort to establish the first human presence on another planetary body.

A science outpost, emphasizing the advancement of scientific knowledge and gaining operational experience by building and maintaining a permanent observatory beyond the Earth.

Evolutionary expansion, which would sustain a methodical, step-by-step program to open the Solar System for exploration, space science research, extraterrestrial resource development and, ultimately, permanent human presence.

Within the case study framework, detailed mission analyses and system engineering studies were performed to define a full set of concepts and requirements for each option. These analyses included an assessment of required environmental and scientific data, low-Earth orbit space stations, advanced technology, Earth-to-orbit transportation needs, in-orbit vehicles and assembly facilities, number of crew members and requisite life science research, and provisions for systems and activities to be conducted on planetary surfaces. The cases included Human Expedition to Phobos, Human Expeditions to Mars, Lunar Observatory, and Lunar Outpost to Early Mars Evolution.

During FY 1989 a range of case studies were reviewed to test the assumptions concerning the capabilities that are needed in order to ensure that this Nation can pursue the long-range goal of human exploration of the Solar System in the future. The results indicate that the nation must invest in Space Station Freedom, Pathfinder technology, life sciences research, Earth-to-orbit transportation, and precursor robotic missions.

Committee views

Space Exploration Budget Line

A program for Space Exploration was established in 1987 by NASA as a response to America's Future in Space study (Ride Report) and a need recognized by the National Commission on Space (The Paine Commission). Using funds acquired from other NASA offices, this program has begun defining the next major manned goal of the U.S. civil space program. Substantial progress has been made this past year in studying the needs of a range of manned missions, specifically: (1) Human Expedition to Phobos, (2) Human Expedition to Mars, (3) Lunar Outpost, and (4) Lunar Outpost to Early Mars evolution. These studies have driven out generic requirements that are necessary to accomplish these and similar missions; requirements such as (1) heavy-lift launch vehicles, (2) expanded life sciences research, and (3) Mars and Earth Aerocapture. These studies have begun to help define the direction for key program offices at NASA such as (1) unmanned planetary exploration, (2) advanced launch vehicles, and (3) Pathfinder.

These initial results need to be continued and expanded into a long-range, long term activity which would be an integral and identifiable NASA program. Accordingly, the Committee has provided a dedicated budget (i.e., its own line in the NASA budget). This

would give Space Exploration a visibility and credibility to the non-NASA scientific community as well as demonstrate that the development of a manned exploration program is a permanent part of NASA. The latter is necessary to attract talented young scientists, engineers, and managers from NASA's field centers (and Headquarters) into the program by offering them a viable long-term career path.

The Committee requests that in future fiscal years, NASA submit the budget for Space Exploration with its own budget line and include budget estimates so that they can be included in a multiyear authorization.

International participation in exploration

The Committee has long recognized the advantages of international cooperation (using the capabilities of other nations in joint programs) and has encouraged NASA to do so for several years in its authorization acts. The Committee has also aggressively pursued a cooperative dialogue on space programs with the USSR (such as the Committee's delegation to the USSR in October 1985) in part as a means to encourage the peaceful use of outer space. The desire for international collaboration on major programs (especially major exploration efforts) is recognized by a wide spectrum of policy experts as was evident in the testimony of witnesses in the February 8 and 9, 1989 hearings on "Studies and Recommendations Made To The Bush Transition Team." As was also pointed out by a witness in that hearing, "We must have a clear and common purpose for each partnership—they will no longer work simply as a means of leveraging U.S. funding or reducing vulnerability to budget cuts."

To maximize the benefits and reduce the cost to the U.S., NASA must increase international collaboration on major new projects such as the next manned exploratory mission. In the past, international cooperation has begun during and after the development/hardware phase. However, the anticipated magnitude of any next major manned mission may well require cooperation at the exploratory study and/or feasibility study phases. Therefore, to develop closer collaboration and take into account the increasing sophistication and independence of foreign programs, the Committee recommends that NASA utilize FY 1990 funds to initiate preliminary studies of candidate cooperative missions with other space faring entities including the Space Station partners and the USSR.

Moon and Mars initiatives

Human exploration and settlement beyond low Earth orbit will be one of mankind's most profound endeavors of the 21st Century. In this context, the Committee enthusiastically supports the long term goals of President George Bush as articulated in his national address on July 20, 1989 during the 20th anniversary celebration of the Apollo 11 lunar landing.

In his address, the President declared that it was time for "a sustained program of manned exploration of the solar system," leading to "the permanent settlement of space." Toward this end, the President proposed the following long range commitments:

An operational Space Station "Freedom" for the 1990's.

A lunar base to be established after the year 2000.

A manned Mars mission to follow the lunar base.

President Bush assigned the Vice President and the National Space Council to develop specific proposals to accomplish these goals.

The Committee requires that the Administration, through the National Space Council, present to Congress no later than January 15, 1990, such an implementation plan. The plan should include target dates for achieving each milestone, specific funding projections, and opportunities for international cooperation.

The Committee also requires that the Administration's plan provide a detailed accounting of how the initiatives will be paid for within an already tight federal budget. The Committee believes that these new initiatives should not jeopardize the long-term health of unmanned space missions, and should not be paid for at the expense of non-military discretionary programs.

The space activities of the world's spacefaring nations are becoming increasingly interdependent. Space Station "Freedom" is a prime example of international cooperation. In the interest of maximizing the effectiveness of the Moon and Mars initiatives, and in order to minimize associated costs to the U.S., the Administration should invite other nations to share in the program during its earliest development stages. In addition, the Administration should set an upper limit of one-half of the total cost of the Moon/Mars effort as the U.S. contribution. Given the maturity of other nations in space technology, no major initiative in space should be undertaken without significant international participation.

The Committee supports the President's vision to expand human experience into the solar system. We are concerned, however, that the Administration demonstrate the leadership necessary to present a plan as soon as possible, and to show how we can realize these goals in this era of budget austerity. The members of this Committee look forward to working with the Administration toward meeting its objectives in space.

Section 4(1)(M) Safety, reliability, maintainability, and quality assurance

President's request:	
Fiscal year 1990	$23,300,000
Committee recommendation:	
Fiscal year:	
1990	23,300,000
1991	24,000,000
1992	24,300,000

Committee authorization recommendation

Section 4(1)(M) authorizes appropriations of $23,300,000 for fiscal year 1990 for Safety, Reliability, Maintainability, and Quality Assurance activities. This is equal to the amount contained within the President's request.

Section 4(1)(M) also authorizes appropriation of $24,000,000 for fiscal year 1991 and $24,300,000 for fiscal year 1992 for Safety, Reliability, Maintainability, and Quality Assurance activities. These authorization levels are equal to the Administration's baseline estimate.

Program description

The Safety, Reliability, Maintainability, and Quality Assurance program within NASA is intended to reduce the overall level of risk within the agency's projects and activities. This is accomplished through such activities as the conduct of independent assessments, reviews, analyses, studies, and tests; the establishment of standards and guidelines; and the development of new inspection technologies, techniques, and devices.

Section 4(1)(N) Tracking and data advanced systems

President's request:	
Fiscal year 1990	$19,900,000
Committee recommendation:	
Fiscal year:	
1990	19,900,000
1991	21,000,000
1992	22,000,000

Committee authorization recommendation

Section 4(1)(N) authorizes the appropriation of $19,900,000 for fiscal year 1990 to support Tracking and Data Advanced Systems. This is equal to the amount contained within the President's request.

Section 4(1)(N) also authorizes the appropriation of $21,000,000 for fiscal year 1991 and $22,000,000 for fiscal year 1992 for Tracking and Data Advanced Systems. These authorization levels are equal to the Administration's baseline estimate.

Program description

The Advanced Systems program provides for higher performance tracking and data handling capabilities and will address planned future mission requirements. In addition, it supports improved cost-effectiveness and reliability for future mission planning.

Section 4(1)(O) University Space Science and Technology Academic Program

President's request:	
Fiscal year 1990	$35,000,000
Committee recommendation:	
Fiscal year:	
1990	35,000,000
1991	40,000,000
1992	45,000,000

Committee authorization recommendation

Section 4(1)(O) authorizes the appropriation of $35,000,000 for fiscal year 1990 for the University Space Science and Technology Academic Program. This is equal to the amount contained within the President's request.

Section 4(1)(O) also authorizes the appropriation of $40,000,000 for fiscal year 1991 and $45,000,000 for fiscal year 1992 for the University Space Science and Technology Academic Program. This authorization is based on the Administration baseline of $38,000,000 in fiscal year 1991 and $41,000,000 in fiscal year 1992 and the addition of $2,000,000 and $4,000,000 for fiscal years 1991 and 1992 respectively. The Committee has increased the funding in order to

encourage faster growth in the National Space Grant College and Fellowship program.

Program description

The University Space Science and Technology Academic Program supports research and training of space scientists and creates and maintains strong, mutually beneficial working relations with the academic community.

Fiscal year 1990 funding will provide for the continuation of agency-wide university and minority university programs which were previously budgeted in other NASA programs. Fiscal year 1990 will allow for the continuation and modest increase in the graduate Student Researchers Program, the Summer Faculty Fellowship program, and the Innovative Research Program. Fiscal year 1990 funding will be used to increase Historically Black Colleges and Universities (HBCU) participation in NASA sponsored programs and establish two HBCU Space Science and Engineering Centers of Excellence (SSECE). Fiscal year 1990 funding will also be used to expand relationships with universities other than HBCU which have significant populations of minorities traditionally under-represented in science and engineering. As mandated in NASA's FY 1988 Authorization act, funding is also provided for the National Space Grant College and Fellowship program which will be implemented to broaden still further the base of universities involved in space related research.

Committee view

Previously NASA budgeted for agency-wide university and minority university programs within other NASA programs. In fiscal year 1990 these educational programs have been gathered together within the collective University Space Science and Technology Academic Programs. The Committee welcomes the emphasis NASA has placed on this function by virtue of this budget line item identification.

The Committee is aware that many indicators suggest that it will be difficult to find sufficient numbers of scientists and technicians to support the Nation's needs to remain competitive in science and technology. The number of students seeking advanced degrees in the related sciences is declining, the quality of education in the public school system has, on average, been declining for many years, and the number of college age persons in the population is expected to decline by 25 percent in the next decade. The Committee, in recognizing these disturbing educational and demographic trends, believes that it is essential that educational programs be designed to increase the number of graduate students studying space science or space technology and engineering, and to increase the participation of women and minorities who do not traditionally enter these fields. Without an expanded set of incentives quickly established, NASA may face a manpower crisis in the near future.

The Committee believes that NASA can, through continued implementation of its university and university minority programs, expand the commitment and involvement of students in space science and space technology. In addition, the Committee directs

NASA to accelerate the growth of the National Space Grant College and Fellowship Program. Through this program, NASA will:

a. Encourage and support Federal funding for graduate fellowships in fields related to space;

b. Create and maintain stronger and mutually beneficial working relationships with the private sector and university research communities;

c. Encourage and support the existence of interdisciplinary programs of space research within this Nation's university community where integrated activities of training, research and public service take place; and,

d. Encourage and support the existence of consortia, made up of university and industry members, which provide collectively greater resources for space science research and training as well as enhanced capabilities to allow for rapid technology transfer to the private sector.

The Committee especially encourages NASA to give adequate and fair consideration to consortia applicants which pool regional assets in education and technology. For example, the successful Challenger Center provides an opportunity for productive and useful regional collaboration.

Educational consortia also provide a means of distributing funds to educational institutions and geographic areas which have been unable to participate in our Nation's space program.

Section 4(1)(P) Comet Rendezvous Asteroid Flyby/Cassini

President's request:	
Fiscal year 1990	($30,000,000)
Committee recommendation:	
Full multiyear program funding	1,600,000,000

Committee authorization recommendation

Section 4(1)(P) authorizes full multiyear funding of $1,600,000,000 for the combined Comet Rendezvous Asteroid Flyby and Cassini missions. This authorization will provide for a more stable and more economical funding base for the development of these closely related missions, resulting in cost savings to the government and maximization of the science output of the missions. The funding is to be released as NASA accomplishes, to the satisfaction of the Committee, three major programmatic milestones; preliminary design review, critical design review, and systems integration and testing.

Program description

The Comet Rendezvous Asteroid Flyby (CRAF) and Cassini (the Saturn Orbiter/Titan Probe) missions are planned for launch in 1995 and 1996, respectively. The CRAF/Cassini program will build upon the discoveries of the Pioneer and Voyager spacecraft, and will provide unprecedented information on the origin and evolution of our solar system. CRAF will provide the first long-term study of a comet, its active nucleus, and the nature and behavior of its ejected gases. Cassini will provide intensive, long-term observations of Saturn's atmosphere, rings, magnetosphere and moons. Together these missions will help to establish the early evolutionary history of the solar system.

Committee view

The CRAF/Cassini mission is proposed as a new science start for a number of critical reasons. The orientation of the planets is going to be optimal for the missions in 1995 and 1996. Another opportunity to perform these missions will not come for many years. Furthermore, by making use of commonality of design and sharing of spare parts, these two missions can be more economically achieved if the commitment to perform both of them is made at this time. To attain this the Committee has recommended multiyear funding. In this particular case, multiyear funding provides economies of commonality and multi-spacecraft acquisition. It stabilizes the science development and, therefore, optimizes the science output. Lastly, the CRAF/Cassini missions represent an important effort by scientists to understand the origin and evolution of the solar system and critical details about the chemical evolution of molecules formed elsewhere in the universe.

The Committee's authorization approach is intended to provide program planners with known, stable funding and also sufficient flexibility to manage funds consistent with program milestones rather than calendar dates. In addition, the Committee's authorization constitutes an absolute cap which cannot be exceeded without the enactment of subsequent legislation to provide additional budget authority. Such program control is essential in maintaining budget flexibility for other future science new starts. The Committee would only be receptive to requests for such legislation under extraordinary circumstances.

SECTION 4(2) SPACE FLIGHT, CONTROL AND DATA COMMUNICATIONS

Section 4(2)(A) Space shuttle production and operational capability

President's request:	
Fiscal year 1990	$1,305,300,000
Committee recommendation:	
Fiscal year:	
1990	1,264,500,000
1991	1,303,000,000
1992	1,368,000,000

Committee authorization recommendation

Section 4(2)(A) authorizes the appropriation of $1,264,500,000 for fiscal year 1990 to support Shuttle Production and Operational Capability. This is $40,800,000 less than the President's request. This decrease reflects the delays that are being experienced in initiating the development program for the Advanced Solid Rocket Motor (ASRM), and the availability of prior-year funds that result from the decision to pursue a private financing option for the purchase of the facilities, tooling, and equipment that will be utilized within the program. The Committee will entertain a request from NASA to reprogram the $27,000,000 appropriated within the fiscal year 1989 budget for the construction of ASRM facilities. The Committee also anticipates that excess fiscal year 1989 ASRM funds produced by program delays as well as approximately $10,000,000 in funds that had been earmarked for the purchase of tooling and equipment (no longer necessary because of the private financing decision) will carryover for use in fiscal year 1990.

Section 4(2)(A) also authorizes the appropriation of $1,303,000,000 for fiscal year 1991 and $1,368,000,000 for fiscal year 1992 for Shuttle Production and Operational Capability. These authorization levels are equal to the Administration's baseline estimate.

Program description

The objectives of the Shuttle Production and Operational Capability program are to provide the hardware and modifications needed to support the Space Shuttle flight manifest; complete the fleet of Space Shuttle Orbiters, including building a replacement Orbiter for the Challenger; develop improvements in the Space Shuttle Main Engine, Solid Rocket Booster, and External Tank; develop and produce an Advanced Solid Rocket Motor (ASRM); develop enhanced launch site capabilities; and develop an Extended Duration Orbiter (EDO) capability.

Committee views

Orbiter production line

The Committee is becoming increasingly concerned by the lack of a comprehensive long-term policy for how to handle the production line that is used to manufacture Space Shuttle Orbiters. In the past, decisions regarding this production line have generally been made on a year-to-year basis. The time is quickly approaching, however, when NASA must make a longer-term decision regarding whether to build an additional Orbiter or to shutdown this important production line.

The Committee believes that it is imperative that a policy be developed for how to handle this production line over the entire life of the Space Shuttle fleet. Among the options that are available include:

Over the next few years, build at the most efficient rate possible all of the Orbiters that are expected to be needed throughout the life of the Space Shuttle program and then shutdown the production line;

Keep the production line open throughout the life of the Space Shuttle program by continuously building Orbiters at a slow rate that is calculated to provide replacement Orbiters at a pace that will roughly equal the rate at which they will either wear out or be lost in accidents; or,

After building a replacement set of structural spares, shutdown the production line and only reopen it if future accidents occur at a rate that makes this necessary.

It is clear that each of these options carries with them a differing set of costs, risks, and programmatic impacts. It is equally clear that to arrive at a viable long-term policy, the Agency must study available options and their affiliated impacts in a thorough manner.

Accordingly, the Committee directs that NASA undertake whatever studies and analyses are required to provide for a long-range plan for how to handle the production line for Space Shuttle Orbiters throughout the life of the Space Shuttle program. The Committee also directs that the Agency then formulate a draft of such a plan and submit it to the Committee on Science, Space, and Tech-

nology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate by March 1, 1990.

Production vulnerability of the space program

The Committee has become increasingly concerned by the events of the past two years that have demonstrated the vulnerability of the U.S. space program to the loss of a single lower-tier supplier deep within the industrial base of this country. These events have included the explosion at the PEPCON ammonium perchlorate plant in Henderson, Nevada in May of 1988, and the threatened closing of the AVTEX Rayon fiber plant in Virginia in November of 1988.

Witnesses have testified that the Administration is in the process of conducting an extensive survey to determine if there are any other single sources of vulnerability within the U.S. industrial base that could threaten the viability of this country's space program. The Committee directs that NASA (in consultation with the Department of Defense and other relevant Federal agencies) build upon the results of this survey by formulating a draft policy and implementation plan for how to deal with the vulnerabilities that relate to the civil space program. The Committee also directs that NASA submit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science and Transportation of the Senate by July 1, 1990 a full report on the results of the survey along with a copy of the draft policy and implementation plan that is designed to deal with the civil space vulnerabilities that have been identified.

Hardware improvements

Throughout the life of the Space Shuttle program, engineers and managers at NASA and within its contractor work force have been vigilant for ways in which the flight hardware could be improved. The Committee has always encouraged the Agency to adopt hardware improvements that would enhance the overall safety of the Space Shuttle. In the past, the Committee has also been supportive of developments and modifications that would improve the operating performance of the Shuttle.

As the Space Shuttle begins to mature, however, the Committee believes that improvements should predominantly focus on changes that are required to make the system safe, to fix things that do not work correctly, or to make improvements that are required to enhance the man-related capabilities of the system. Of major importance in the latter category are enhancements that enable the Space Shuttle to increase its duration in orbit.

In the safety area, the Committee believes that NASA should give serious consideration to modifying all of the Orbiters so they can deorbit and land in a fully automated mode (i.e., without interaction by the crew). The Committee requests that NASA study the feasibility, desirability, and cost of making such a modification and report the results of that study to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science and Transportation of the Senate by April 15, 1990.

Section 4(2)(B) Space shuttle, operations

President's request:	
Fiscal year 1990	$2,562,700,000
Committee recommendation:	
Fiscal year:	
1990	2,500,700,000
1991	2,491,900,000
1992	2,667,900,000

Committee authorization recommendation

Section 4(2)(B) authorizes the appropriation of $2,500,700,000 for fiscal year 1990 to support Space Shuttle Operations. This is $62,000,000 less than the President's request. This decrease partially reflects the cancellation of a Space Shuttle mission in fiscal year 1989, 1992, and 1993, and the addition of a single Space Shuttle mission in fiscal year 1991. The Committee has also chosen not to provide long-lead funding for the first "Flight Opportunity" scheduled for fiscal year 1992. The Committee believes that this mission is more likely to take the form of a replacement for a mission that will be substituted some time during the next three years. Accordingly, this mission will not require the purchase of additional long-lead flight hardware. The Committee will be happy to entertain funding requests for future "Flight Opportunities" if such requests are required to maintain a required flight rate.

Section 4(2)(B) also authorizes the appropriation of $2,491,900,000 for fiscal year 1991 and $2,667,900,000 for fiscal year 1992 for Space Shuttle Operations. These authorization levels are less than the Administration's baseline estimate. The committee's recommendation is that TDRS–G be flown on an expendable launch vehicle.

Program description

Space Shuttle Operations provides for Space Shuttle launch services for NASA payloads, and, on a reimbursable basis, for those of the DOD, other civil agencies, and certain commercial and international users. Within this account, flight hardware is produced, refurbished, and repaired; and manpower, propellants, and other materials are furnished to conduct and support both flight and ground operations. Operations funding also provides for replacement spares inventory for both flight and ground support hardware as this hardware is consumed or damaged as a result of flight related activities.

Committee view

Economies within the Space Shuttle Program

Since the *Challenger* accident, the United States has invested billions of dollars in redesigning, recertifying, and purchasing the flight and ground hardware that was required to return the Space Shuttle to safe flight operations. The scope and extent of the activities that were undertaken by NASA and its associated contractors prior to the return to flight was truly impressive.

The Committee also notes that now that the Space Shuttle has begun flying again, the overall Shuttle budget continues at an annual level that is about $1 billion larger than the pre-accident budget (and more than $2 billion per year more that had been pro-

jected prior to the accident for this phase of the program). When funding requirements for the Replacement Orbiter, and Shuttle-related expenses for the Construction of Facilities and Research and Program Management are included, the expenditures for the Space Shuttle program will exceed $4.5 billion during FY 1990.

It is clear that maintaining a high level of quality and safety within the Space Shuttle program needs to be the primary goal of government and industry managers throughout the program. It is also clear that this goal should be the preeminent concern of these managers for as long as the Space Shuttle is in operation.

On the other hand, current budget realities emphasize the need for adopting economies within the Space Shuttle program whenever such economies can be implemented with no adverse impact on quality or safety.

Accordingly, the Committee encourages NASA managers to be vigilant for areas such as changes in organization, procedures, operations, staffing, hardware designs, and software design which could result in a reduction in the funds required to support the Space Shuttle program while causing no reduction in quality and safety levels.

The Committee requests NASA to conduct a study to determine what efficiencies the Agency believes could be adopted within the Space Shuttle program during the next five years, and to report the results of that study to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science and Transportation of the Senate by March 1, 1990.

Section 4(2)(C) Expendable launch vehicles and services

President's request:	
Fiscal year 1990	$169,500,000
Committee recommendation:	
Fiscal year:	
1990	171,500,000
1991	240,000,000
1992	308,000,000

Committee authorization recommendation

Section 4(2)(C) authorizes the appropriation of $171,500,000 for fiscal year 1990 to support Expendable Launch Vehicles and Services. This is above the President's request by $2,000,000. This increase is due to the authorization of funds for an ELV for the launch of the TDRS–G satellite.

Section 4(2)(C) also authorizes the appropriation of $240,000,000 for fiscal year 1991 and $308,000,000 for fiscal year 1992 for Expendable Launch Vehicles and Services. These authorization levels are above the Administration's baseline estimate by, respectively, $26M and $66M in order to continue the procurement of an expendable launch vehicle for the TDRS–G satellite.

Program description

Funding for the Expendable Launch Vehicles and Services provides launch services for unmanned civil U.S. government space missions that do not require the Space Shuttle's unique capabilities. Consistent with the Commercial Space Launch Act, expend-

able launch vehicle services are to be acquired from the U.S. private sector whenever possible. The Committee adopted an amendment requiring the TDRS–G satellite to be launched on an ELV. The Committee also adopted policy language requiring all unmanned payloads to be launched by ELVs after five years.

Committee view

The Committee is concerned that some payloads currently manifested on the Space Shuttle do not require the presence of a crew and could readily be moved to expendable launch vehicles. The TDRS series of spacecraft, beginning with TDRS–F, is an example.

The Committee believes that all future generations of Tracking and Data Relay Satellites should be specifically designed and "baselined" for launches on expendable launch vehicles. The Committee will not entertain requests for new program starts for advanced TDRS systems that do not incorporate this philosophy.

Additionally, the Committee adopted language in Section 3(7) which declares as national policy that the logistics and resupply capability for the Space Station will utilize expendable launch vehicles (including commercial services if available) as well as the Space Shuttle. This "dual string" resupply capability is critical for safety as well as optimal use of the Shuttle.

Section 4(2)(D) Space and ground networks, communication and data systems

President's request:	
Fiscal year 1990	$1,102,100,000
Committee recommendation:	
Fiscal year:	
1990	1,077,100,000
1991	1,159,000,000
1992	1,228,000,000

Committee authorization recommendation

Section 4(2)(D) authorizes the appropriation of $1,077,100,000 for fiscal year 1990 to support Space and Ground Network, Communications and Data Systems. This is $25,000,000 less than the President's request.

This decrease is made, in part, in anticipation of revenues from the lease of the TDRS "C-band" transponders. The remainder of the reduction will be taken from general program reserves.

Section 4(2)(D) also authorizes the appropriation of $1,159,000,000 for fiscal year 1991 and $1,228,000,000 for fiscal year 1992 for Space and Ground Networks, Communications and Data Systems. These authorization levels are equal to the Administration's baseline estimates.

Program description

This program provides vital tracking, telemetry, command, data acquisition, communications, and data processing support to meet the requirements of all NASA flight projects. In addition to NASA flight projects, support is provided on a reimbursable basis for projects of the Department of Defense (DOD), other Government agencies, commercial firms, and other countries and international organizations.

Support is provided for Earth orbital, planetary and solar system exploration spacecraft missions, launch vehicles, research aircraft, sounding rockets and balloons. Included in Earth orbital support are the Space Shuttle, Spacelabs, and scientific and applications missions. The various types of support provided include: (a) tracking to determine the position and trajectory of vehicles in space; (b) acquisition of science and space applications data from on-board experiments and sensors; (c) acquisition of engineering data on the performance of spacecraft and launch vehicle systems; (d) reception of television transmissions from space vehicles; (e) transmission of commands from ground facilities to spacecraft; (f) voice communications with astronauts; (g) transfer of information between the various ground facilities and control centers; and (h) processing of data acquired from launch vehicles and spacecraft. Such support is essential for achieving the scientific objectives of all flight missions and for executing the critical decisions which must be made to assure the success of these missions.

SECTION 4(3) CONSTRUCTION OF FACILITIES

President's request:	
Fiscal year 1990	$341,800,000
Committee recommendation:	
Fiscal year 1990	331,800,000

Committee authorization recommendation

Section 4(3) authorizes the appropriation of $331,800,000 including $71,100,000 for aeronautical facilities for fiscal year 1990 to provide contractual services for the repair, rehabilitation and modification of existing facilities; the construction of new facilities and the acquisition of related facility equipment; environmental compliance activities; the design of facilities projects; and advanced planning related to future facilities needs. This is $10,000,000 less than the President's request. This reduction is made without prejudice and may be applied at NASA's discretion except aeronautical facilities.

Program description

The projects and amounts in the budget estimates reflect time-sensitive initiatives required to support the specific program objectives of the Space Station Freedom and Space Flight activities. Other program requirements for 1990 include: refurbishing bridges at Merritt Island; rehabilitation of the Spacecraft Assembly and Encapsulation Facility II at the Kennedy Space Center; rehabilitation of the central heating/cooling plant at the Johnson Space Center; construction of a Data Operations Facility and a Quality Assurance and Detector Development Laboratory at the Goddard Space Flight Center; construction of an Observational Instrument Laboratory and modernization of the south utility systems at the Jet Propulsion Laboratory; projects to repair, restore, and modernize NASA's aeronautical research and development facilities at Ames, Lewis, Langley, and the Plumb Brook Station; construction of an Automation Sciences Research Facility at the Ames Research Center; construction of a Supersonic/Hypersonic Low Disturbance

Tunnel at the Langley Research Center; and modifications for seismic safety at Goldstone, California.

The FY 1990 program continues to meet the objectives of preserving and enhancing the capabilities and usefulness of existing facilities, and ensuring safe, economical and efficient use of the NASA physical plant. This request continues the necessary rehabilitation and modification program begun in prior years and continues a repair program. The repair program restores facilities to a condition substantially equivalent to their originally designed capability. The minor construction program continues to provide a means to accomplish smaller facility projects which accommodate changes in technical and institutional requirements. The environmental compliance and restoration program ensures that statutory environmental requirements are met and any necessary remedial action is promptly taken.

Funds requested for facility planning and design cover advance planning and design requirements for potential future projects, master planning, facilities studies, engineering reports and studies and the preparation of facility project design drawings and bid specificiations.

SECTION 4(4) RESEARCH AND PROGRAM MANAGEMENT

President's request:	
Fiscal year 1990	$2,032,200,000
Committee recommendation:	
Fiscal year 1990	2,032,200,000

Committee authorization recommendation

Section 4(4) authorizes the appropriation of $2,032,200,000 for fiscal year 1990 for Research and Program Management. This is equal to the President's request. The Committee recognizes, however, that this amount is wholly inadequate to meet the future needs of the Nation's space program, especially with the initiation of major new space exploration initiatives. Accordingly, the Committee intends that future requests for new initiatives be accompanied by a long-range plan for human resource development that can support a multiyear authorization.

Program description

The FY 1990 budget provides funding for an increase in the size of NASA's civil service work force. These additional personnel are urgently required: to meet the staffing levels associated with the Space Station; to manage the 85 percent of NASA's work that is contracted to private industry; and to provide an ability to respond quickly to management or technical problems as they occur.

The Research and Program Management appropriation funds the performance and management of research, technology, and test activities at NASA installations, and the planning, management, and support of contractor research and development tasks. This account provides the underpinnings for the successful accomplishment of the nation's aeronautics and space programs.

This account provides for the payment of civil service salaries and expenses, and costs of conducting maintenance on NASA facilities.

SECTION 4(5) INSPECTOR GENERAL

President's request:	
Fiscal year 1990	$8,795,000
Committee recommendation:	
Fiscal year:	
1990	8,795,000
1991	9,000,000
1992	9,000,000

Committee authorization recommendation

Section 4(5) authorizes the appropriation of $8,795,000 for fiscal year 1990 to support the activities of the Inspector General. This is equal to the amount contained within the President's request.

Section 4(5) also authorizes the appropriation of $9,000,000 for fiscal year 1991 and $9,000,000 for fiscal year 1992 to support the activities of the Inspector General. These authorization levels are equal to the Administration's baseline estimate.

Program description

The Office of Inspector General was created in 1978 by Public Law 95–452 as an independent and objective unit within NASA. The purposes and mission of the Office are to: conduct and supervise audits and investigations within the Agency; promote economy, efficiency, and effectiveness in the administration of the Agency's programs and operations; prevent and detect fraud, waste, and abuse within the Agency; and to keep the Administrator and the Congress fully and currently informed about NASA programs, deficiencies relating to the administration of such programs, and the necessity for and progress of corrective actions.

Committee views

The Committee intends that the Office of Inspector General fulfill the intent of P.L. 95–452 to aggressively and thoroughly oversee all Agency activities to ensure the avoidance of waste, fraud, and abuse; and to keep the Congress fully and currently informed about deficiencies that are uncovered and corrective actions that should be applied.

The Committee further intends that the Inspector General be provided adequate resources and personnel, distinct from other program management and contract monitoring activities, in order to maintain an independent posture.

Section 4(6) provides that appropriations authorized for "Research and Development" and Space Flight, Control, and Data Communications" may be used for (1) items of a capital nature (other than acquisitions of land) at non-NASA locations for the performance of research and development contracts and (2) grants to nonprofit organizations for scientific research and purchase or construction of facilities, provided that construction of any facility does not exceed $500,000 or the Administrator has notified the appropriate authorizing committees in Congress.

Section 4(7) authorizes appropriations made available under this Act and subject to an appropriations Act (except those for "Research and program management") to remain available without

fiscal year limitation. Certain research and program management contracts may be entered into at any time during the fiscal year.

Section 4(8) provides that up to $35,000 of "Research and program management" funds may be used for scientific consultations or extraordinary expenses.

Section 4(9) allows certain funds designated for "Research and Development", "Space Flight, Control, and Data Communications", and "Research and Program Management" to be used for construction or repair of facilities provided that the cost of each project does not exceed $100,000. It also allows funds designated for "Research and Development" and "Space Flight, Control, and Data Communications" to be used for unforeseen programmatic facility projects less than $500,000. Funds for "Research and Program Management" may be used for work on facilities controlled by the General Services Administration provided each project does not exceed $500,000.

SECTION 5: ADMINISTRATOR'S REPROGRAMMING AUTHORITY

Section 5 authorizes transfers of up to 10 percent of any individual line item among line item accounts 4(3)(A) through 4(3)(LL) except that such authority shall not include authority to reduce the amount authorized for the Observational Instrument Laboratory. With that exception, the amounts may be varied up to 25 percent to meet unusual cost variations following a report by the Administrator or the Administrator's designee to the Committee on Science, Space and Technology in the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate on the circumstances of such action. The total amount authorized for fiscal year 1990 shall not be increased as a result of reprogramming carried out pursuant to this section.

SECTION 6: SPECIAL REPROGRAMMING AUTHORITY FOR CONSTRUCTION OF FACILITIES

Section 6 allows the transfer of appropriations, not exceeding one-half of 1 percent, from "Research and Development" and "Space Flight, Control, and Data Communications" to "Construction of Facilities" for use on programs not presented to the Congress. The Administrator may also use up to $10,000,000 from the "Construction of Facilities" authorization for these purposes. Action pursuant to this section may be taken only after a written report has been transmitted to the appropriate authorizing committees of the Congress and 30 days have passed.

SECTION 7: LIMITATIONS ON AUTHORITY

Section 7 prohibits appropriations from this act from being used for any program not authorized, or in excess of amounts authorized, unless a period of 30 days has passed after notice has been given by the Administrator to the appropriate authorizing committees of the Congress.

SECTION 8: PROCUREMENT OF SPACE SHUTTLE STRUCTURAL SPARE PARTS

Section 8 provides the Administrator authority in the amount of up to $50,000,000 to procure shuttle structural spare parts with

funds appropriated for orbiter production in accordance with "Joint Resolution making continuing appropriations for the fiscal year 1986, and for other purposes."

SECTION 9: NON-FEDERAL FINANCING OF FACILITIES

Section 9(a) limits the Administrator's authority to enter into agreements that provide for non-Federal financing of any facility. That limitation may only be waived upon specific legal authority.

Section 9(b) provides the Administrator authority to enter into agreements providing for a neutral buoyancy facility and a payload processing facility. The Administrator must certify that each agreement is in the best interests of the United States considering the following: (1) net cost savings to the Federal Government over the life of the agreement, (2) the amount of non-Federal revenues the facility anticipates receiving, (3) the amount and nature of the equity investment or other risk assumed by the financing source, (4) the amount of potential exposure to termination liability of the United States under the agreement, (5) the annual burden of guaranteed payments, if any, incurred by the United States under the agreement, and (6) the ways in which such agreement promotes the commercialization of space. Standard accounting practices shall be used for each such certification. Each certification shall be annually updated and resubmitted to the Congress.

Section 9(c), in regards to preferred agreements, directs the Administrator to seek arangements which would reduce the cost to the United States through (1) private sector operation of the facility, (2) private sector shared use of the facility, (3) innovative design and construction, and (4) shared risk arrangements. No agreement should be entered into if it would impair NASA's program schedule.

Section 9(d) allows the Administrator to provide contingent liability to cover programs pursuant to this section terminated for convenience purposes. The liability agreement shall limit the potential payments by the Federal Government to amounts provided in advance to NASA in appropriations Acts. If funds for this purpose have not already been provided, other unobligated appropriations of NASA may be used. The amounts for contingent liability shall not exceed 80 percent of the costs resulting from any such termination for convenience.

SECTION 10: GEOGRAPHICAL DISTRIBUTION

Section 10 directs the Administrator to distribute funds geographically in order to ensure the broadest practical participation in the space program.

SECTION 11: BUY AMERICAN

Section 11 requires the Administrator to "buy American" for products completely assembled in the United States. When completely assembled, not less than 50 percent of the final product will be domestically produced and the difference between foreign and domestic bids should not exceed 6 percent. This section does not apply where such an acquisition would not be in the public interest, national security considerations would dictate otherwise, or the

U.S. Trade Representative determines that such an award would be inconsistent with international agreements to which the U.S. is a part.

Section 11(e) requires the Administrator to report to Congress the number of contracts entered into with foreign and domestic firms in accordance with this section.

SECTION 12: AMENDMENTS TO THE NATIONAL AERONAUTICS AND SPACE ACT OF 1958

Section 12 amends Section 203 of the National Aeronautics and Space Act of 1958 (42 U.S.C. 2473) to encourage the use of commercially provided space services and hardware and, in particular, to procure, on a commercially reasonable basis, space launch services and hardware.

SECTION 13: COMMERCIAL SPACE LAUNCH ACT AUTHORIZATION

Section 13 authorizes the appropriation of $4,392,000 to the Department of Transportation Office of Commercial Space Transportation to carry out this act for fiscal year 1990.

SECTION 14: NATIONAL SPACE COUNCIL

Section 14(a) amends section 501 of the NASA Authorization Act, Fiscal Year 1989 (42 U.S.C. 2471), to provide for up to six individuals to be compensated at a grade of level VI of the Senior Executive Service. This section also allows for the employment with compensation of experts and consultants in accordance with section 3109 of title 5 U.S.C. Finally, this section authorizes $1,200,000 to carry out the activities of the National Space Council.

Section 14(b) amends section 5314 of title 5, U.S.C. by adding at the end the following: "Executive Secretary, National Space Council".

SECTION 15: INTERNATIONAL SPACE YEAR

Section 15 encourages the President, in consultation with foreign leaders, to develop an International Space Year (ISY) agenda. The President is also encouraged to declare a World Space Congress (to be convened in 1992), to solicit the help of the American public to develop International Space Year Activities, and to direct NASA to continue to develop ISY activities focusing on Mission to Planet Earth. The President is directed to report to Congress no later than January 1, 1990 on the steps taken pursuant to this section.

SECTION 16: ADVANCED SOLID ROCKET MOTOR CONTINGENT LIABILITY

Section 16(a) allows the Administrator to provide contingent liability in the event that the Government for its convenience terminates the Advanced Solid Rocket Motor (ASRM) program. Any action pursuant to this section would necessarily follow the selection of a proposal for a privately financed ASRM production facility to be constructed on a government site. The liability payments are limited to the amounts provided to the ASRM program by the Appropriations Acts. If funds have not been provided, such payments would be made from other unobligated appropriations of NASA.

Section 16(b) notes that nothing in this Act shall inhibit the Administrator from developing liquid or hybrid rocket boosters for the space shuttle.

Section 16(c) requires the Administrator to submit four annual reports—a report on the projected cost of the completion of the design, development, and qualification of the ASRM: a report on interest rate changes; a report on the projected unit costs; and a report on increased payload capability. The subsection also requires assessments from the National Research Council regarding the need for ASRM as well as safety and performance enhancement options.

SECTION 17: SPACE SHUTTLE USE POLICY

Section 17(a) states that it is the policy of the United States to use the space shuttle for purposes that require the presence of man or the unique capabilities of the space shuttle.

Section 17(b) directs the Administrator to submit a report to the Congress within 6 months of the enactment of this Act outlining (1) the details of the implementation plan, (2) a list of the purposes that require the presence of man, (3) a proposed schedule for the implementation of the policy stated in subsection (a), (4) an estimate of the costs to the United States of implementing the policy, and (5) a list of special certifications the Administrator expects to make.

Section 17(c) denotes special certifications for shuttle unique payloads that do not require the presence of man. If special circumstances exist, the Administrator must certify in writing to the appropriate authorizing committees in Congress the need for shuttle launch. Also, if there is available cargo space on a shuttle mission otherwise compliant with this policy, the Administrator may use the space for secondary payloads that do not require the presence of man.

Section 17(d) limits secondary payloads carried on the space shuttle to payloads authorized for research, development, demonstration, scientific, and commercial programs.

SECTION 18: FAIR PRICING AGREEMENT

Section 18 relates to fair pricing agreements for international trade in commercial launch services, especially those offered by Australian firms using launch vehicles built in the Soviet Union.

There are plans underway to construct a commercial launch facility in Cape York, Australia. The Committee has been briefed on this facility on several occasions. The Committee has learned that the developer of this facility, the Cape York Space Agency, is conducting negotiations with the Soviet Union for the purchase of Soviet-built rockets for use at Cape York. Concerns have been raised about the effect this arrangement will have on the U.S. commercial launch industry's ability to compete in the world market.

Australian officials have stated to the Committee that in performing financial analyses for the CYSA facility, it was determined that the economic feasibility of the venture is contingent upon the utilization of Soviet-manufactured launch vehicles, since they would be considerably cheaper than comparable Western-built

rockets. There is a general presumption that such large price differentials may be due to Government subsidization.

Concerns have been raised that such pricing will be disadvantageous for the U.S. commercial launch industry. Under this Committee's leadership, Congress has made the creation and maintenance of a domestic commercial launch industry a national priority. Twice in the past six years legislation has been enacted to promote, encourage and strengthen this infant industry. The premise of these legislative efforts is that guaranteed access to space is essential to any spacefaring nation and also that a viable commercial launch industry enhances the national security of the United States. Both of these may be jeopardized if the Soviet Union gains a foothold in the commercial launch market through unfair pricing strategies.

At the same time, satellite manufacturers have expressed the need to have access to any launch facility offering competitively priced launch services and any launch system not specifically prohibited by Export Control regulations. The export of U.S. satellites and our dominance of the world satellite market not only makes a positive contribution to our balance of trade, it also provides significant foreign policy benefits contributing to the national security.

Two approaches are possible for resolving these conflicting points of interest. First, as in the case of the Ariane launch vehicle, the U.S. Trade Representative could enter into negotiations to establish fair pricing standards for international trade in launch vehicles and launch services. In the case of CYSA, the Government of Australia, as the host government, would necessarily assume the role of negotiating agent. Second, Congress could prohibit the export of U.S.-built satellites to any country utilizing Soviet-built launch vehicles.

Section 18 promulgates a policy which first establishes a negotiated approach. Such negotiation need not be undertaken if the President certifies to Congress that the price of launch services offered by the Australians utilizing Soviet Union-built launch vehicles is not more than 25 percent below the price of a launch service using a comparable launch vehicle built in a market-based economy.

Section 18 further establishes that U.S. policy should prohibit the export of U.S.-built satellites for launch on Soviet-built launch vehicles in the absence of an agreement which achieves and ensures fair pricing of commercial launch services in international trade. This prohibition shall not apply if the President certifies that the price of launch services provided by CYSA utilizing Soviet-built launch vehicles is not more than 25 percent below the price of world launch services which use comparable vehicles built in a market based economy.

SECTION 19: EXPORT OF SATELLITES FOR LAUNCH BY THE PEOPLE'S REPUBLIC OF CHINA

Section 19 would extend the suspension of all licenses for the export of United States satellites intended for launch on launch vehicles owned by the People's Republic of China until the President reports to the Congress. The content of the report is outlined in

this section. Elements which must be reported include a halt of political executions for nonviolent protestors and an increase in respect for human rights. This section would also allow for the termination of the suspension if it is in the best interests of the national security of the United States to do so.

SECTION 20: LIFE SCIENCES STRATEGIC PLAN

Section 20 directs the administrator to undertake a detailed study of life science knowledge base requirements. The study would identify needs in the area of life sciences by evaluating currently proposed manned missions, determine a schedule for the acquisition of knowledge to meet the specific mission needs, and develop a strategic plan for accomplishing the necessary research and technology development to meet the schedule.

SECTION 21: COMMISSION FOR INTERNATIONAL COOPERATION IN PLANETARY EXPLORATION

Section 21 would establish a Commission for International Cooperation in Planetary Exploration in order to develop an inventory of intentions and to seek ways of enhancing the exchange of information with regards to lunar and planetary exploration. The members, staff, and logistical support for the Commission are outlined in this section. After performing an intensive study, the commission shall submit a detailed report of the findings. The report shall be submitted within one year of the enactment of this Act.

SECTION 22: OFFICE OF SPACE COMMERCE

Section 22 would establish an Office of Space Commerce within the Department of Commerce and designate it as the principal unit for the coordination of space related issues, programs, and initiatives within the Department of Commerce. The Office would promote private sector investment in space activities while seeking to remove legal, policy, and institutional impediments to space commerce.

The Committee authorizes the establishment of the Office of Space Commerce within the Department of Commerce. Such an office is needed to coordinate space-related issues, programs, and initiatives within the Department. The Department is instructed to submit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a request for funding of the Office within 60 days of enactment of the authorization bill.

SECTION 23: UPGRADING HISTORIC LANDMARK FACILITIES

Section 23 would amend the National Aeronautics and Space Administration Act of 1958 to direct the Administrator to maintain, modify, upgrade, and expand facilities designated as National Historic Landmarks under the National Historic Preservation Act.

SECTION 24: NATIONAL AERO-SPACE PLANE PROGRAM

Background

The National Aero-Space Plane (NASP) program was originally established by President Reagan as a high national priority in the January 1986 State of the Union address. A joint program was immediately established between the Department of Defense (DOD) and the National Aeronautics and Space Administration (NASA) in July 1986.

The program was divided into three phases. Phase I was the concept feasibility study (called Copper Canyon) which ran from 1982 to 1985 and was essentially a pre-NASP phase. The study results defined the technical concept for the NASP program which was to be developed in Phases II and III. Both phases have been revised since the first joint agreement. Phase II (1985–1990) is the Concept Validation Program which has as its goal proving the relevant technologies are sufficiently mature to support the development of an experimental flight vehicle, the X–30.

At the completion of Phase II, September 1990, the schedule calls for an assessment of the progress in technology development in order to determine if it is feasible to continue to Phase III. The last phase of the NASP program, calls for the construction and flight of two vehicles with the first flight in 1995. A single-stage-to-orbit flight is called for in late 1996. The X–30 is designed to be an experimental vehicle with no operational missions or requirements.

The technologies that must be developed in order for the X–30 to fly include:

A. a propulsion engine that is primarily an air-breathing scramjet in design. A scramjet engine is one that is air-breathing and can operate on hydrogen fuel from speeds of approximately Mach 4 to 25;

B. advanced materials in the airframe, engine and other parts of the aircraft that can withstand the high temperatures generated at Mach 25 and at the same time be completely reusable;

C. a completely integrated engine and airframe in the X–30 that can operate effectively under the wide variety of speeds, temperatures, altitudes and flight conditions encountered; and

D. Supercomputer technology that will enable predicting of aerodynamics for the integrated X–30 system before the first flight.

Propulsion

Currently, the best airbreathing aircraft operate at speeds well below Mach 4. (Mach 1 is equal to the speed of sound which is 760 m.p.h. at sealevel). Therefore, the adequacy of facilities to test the scramjet engines from Mach 4–25 which have never been tested before have been a subject of concern. Very good progress has been made in addressing this concern. Recently, the agencies and the contractors have constructed two major full-scale engine facilities capable of tests to Mach 8. Moreover, several experimental shock tunnel combination facilities have been modified to simulate Mach 8–24 flow for propulsion component test

Components of the engine, built to full scale, have been tested up to Mach 7 and the performances have equaled or exceeded the original expectations.

Advanced materials

Some sections of the X-30 are projected to reach the temperatures of 5,000 degrees Fahrenheit or higher during flight. Existing materials used in aircraft cannot withstand this amount of heat, consequently new materials must be developed in the NASP Program with this capability, while at the same time be reusable.

Very good progress is being made by the NASP team, which includes unique management arrangement of a joint research effort by all the NASP contractors.

Integration of engine and airframe

The effective performance of a scramjet will depend on the efficient flow of air into the engine, this, in turn, depends on the shape of the airframe. The underside of the aircraft will be the air inlet to compress air for the engine as well as the engine's exhaust nozzle. Consequently, the engine must be completely integrated with the airframe.

Because of the advances in supercomputer technology, it is possible to predict the integrated performance through computational fluid dynamics (CFD). As a result of the use of CFD, analysis of mixing, combination and engine performance is ahead of schedule. Results, to date, indicate that the propulsions systems for the X-30 are feasible.

Congressional and other related activities

The committee has authorized the NASP program, which is contained in the Administration's NASA budget requests, every year since the creation of the program. The funding history is presented in table one.

TABLE I.—NASP FUNDING

[In millions of dollars]

	Fiscal year—		
	1986–88	1989	1990
DOD	338	231	300
NASA	148	84	127
Total	486	315	427

It is estimated that the corporate investment to date is $500 million and may increase to a total of $750 million by the end of FY 1990.

The fiscal year 1990 budget request, (Table 1) was submitted to Congress by both Presidents Reagan and Bush. However, on April 25, 1989, the Secretary of Defense presented a revised DOD budget to Congress that proposed decreasing the Departments funding level to $100 million for FY 1990 and transferring the program

management to NASA. This decision prompted a Congressional response in the form of legislation to continue the NASP Program.

During the April 26 hearing on the NASA FY 1990 budget request, several questions were asked by Members about the NASP program. In response to the question of what are the future benefits of the NASP program, the NASA witness replied, "I believe that if the United States is going to maintain overall leadership in aeronautics, * * * we must maintain leadership in hypersonics. The technology that will be incorporated in aircraft that are [to be] produced at the turn of the century is the technology that we are developing right now."

Other questions were raised about the status of a NASP type program in other countries. A General Accounting Office assessment of international programs, concluded that other countries are developing technologies for operational aerospace vehicles.

France is developing the Hermes spaceplane, which is shuttlelike. The $5 billion program is scheduled for first launch in 1998.

West Germany is involved in the development of a vehicle, Sangeh II, in a joint effort in the European Space Agency. The two stage launch vehicle is not scheduled for flight before 2005.

United Kingdom research and development efforts have been directed toward the HOTOL. However, at this time, no government funds are being spent on the program.

Japan has a goal of developing a spaceplane. A $6 billion 15 year effort is underway to build a spaceplane. In addition, HOPE–II, a shuttlelike aircraft is currently being tested.

USSR's spaceplane program apparently is underway. A model of a hypersonic cruise airplane was exhibited at the Paris Air Show in 1987. However, few details are known about the level of the USSR effort.

The international effort has a direct impact on the nation's economy, a point stressed by several Members during hearings. The 1989 positive balance of trade in the aerospace industry was over $18.7 billion, the largest of any United States sector. Witnesses followed up on this point with testimony that new advances in aviation technology usually are the result of long-term, high risk research programs, such as the NASP program.

Explanation

Paragraph (a). Findings

(1) Congress finds that the data, technology and advancements gained from National Aero-Space Plane (NASP) research currently underway are vital.

(2) Congress finds that the materials advancements achieved in the NASP research program will lead to important new and innovative technologies for use in the aerospace industry.

(3) Congress finds the advances in aviation technology that will be gained from propulsion systems, aerodynamics, and control systems that would enable the NASP vehicle to take off from conventional runways and achieve Earth orbit, utilizing a single-stage primarily air breathing aircraft, will lead to new important advances for both military and civilian aviation.

(4) Congress finds that aerospace vehicles that could be derived from the NASP program include hypersonic military aircraft, space transportation systems capable of frequent flight and hypersonic commercial flight.

Paragraph (b). Establishment of Program

The Secretary of the Department of Defense (DOD) and the Administrator of the National Aeronautics and Space Administration (NASA) shall jointly establish a National Aero-Space Plane (NASP) program. The flight vehicle, to be developed by 1995, will be primarily an air breathing single-stage-to-orbit and long range hypersonic cruise aircraft. During the development phases, there have been, and will continue to be, produced innovative technologies that could have immediate applications; therefore, the Secretary and Administrator are required to transfer those technologies to the domestic military, civil aviation and private sectors when it is practical.

Paragraph (c). Responsibilities

The Secretary and the Administrator shall have joint responsibility for the management of the NASP program established in paragraph b. The Secretary shall have responsibility for procurement, experimental flight vehicles and overall program administration. The Administrator shall have the responsibility for providing technology development and flight test support and shall have an integral part in the overall program. Both the Secretary and the Administrator shall participate in all aspects of the program.

Paragraph (d). Management Plan

(1) Development. The Secretary and the Administrator shall jointly develop a management plan for the NASP program. The plan shall establish the program goals, major tasks, anticipated schedules, organizational structure, funding profiles, and the details of the responsibilities of the Secretary and the Administrator. In addition, the plan will include procurement strategies for the NASP program.

(2) Submission to Congress. The management plan developed under subsection (1) shall be submitted to Congress within 120 days of enactment of this legislation.

Paragraph (e). Funding

Both the Secretary and the Administrator shall jointly fund the NASP program.

The Secretary is responsible for not less than two-thirds of the program funding and the Administrator is responsible for not less than one-third of the program funding for fiscal year 1990.

For fiscal years after 1990, funding responsibilities shall be in accordance with the management plan developed under section 4 of title II.

SECTIONAL ANALYSIS

A bill to authorize appropriations to the National Aeronautics and Space Administration for Research and Development; Space, Flight, Control, and Data Communications; Construction of Facilities; Research and Program Management; the Inspector General; and for other purposes.

TITLE I—NATIONAL AERONAUTICS AND SPACE CAPITAL DEVELOPMENT PROGRAM

SECTION 1—SHORT TITLE

Section 1 designates that the act may be cited as the "National Aeronautics and Space Administration Multiyear Authorization Act of 1989".

SECTION 2—FINDINGS

Section 2 includes a finding that the United States space program contributes to the nation's competitive advantage in technology and expresses the need for a sustained commitment of financial and human resources to the space program.

SECTION 3—POLICY

Section 3 would direct increased funding for the space program, emphasize the need for a healthy balance between manned and unmanned space activities, and maintain a mixed fleet by utilizing commercial expendable launch vehicles.

SECTION 4—AUTHORIZATION OF APPROPRIATIONS

Section 4 authorizes appropriations for fiscal years 1990, 1991, and 1992.

SECTION 5—ADMINISTRATOR'S REPROGRAMMING AUTHORITY

Section 5 provides the Administrator with limited authority to reprogram individual line items.

SECTION 6—SPECIAL REPROGRAMMING AUTHORITY FOR CONSTRUCTION OF FACILITIES

Section 6 allows the Administrator to transfer some appropriations to programs not presented to Congress provided such transfers are reported in writing to the appropriate authorizing committee.

SECTION 7—LIMITATIONS ON AUTHORITY

Section 7 requires the Administrator to give notice to the appropriate authorizing committee before using appropriations for any

program not authorized or for an amount in excess of that authorized.

SECTION 8—PROCUREMENT OF SPACE SHUTTLE STRUCTURAL SPARE PARTS

Section 8 provides the Administrator with authority to procure shuttle structural spare parts with up to $50,000,000 in funds appropriated for orbiter production.

SECTION 9—NON-FEDERAL FINANCING OF FACILITIES

Section 9 authorizes the Administrator with limited authority to obtain non-federal financing for a neutral buoyancy facility and a payload processing facility.

SECTION 10—GEOGRAPHICAL DISTRIBUTION

Section 10 directs the Administrator to distribute funds geographically in order to ensure the broadest participation practical in the aeronautics and space programs.

SECTION 11—BUY AMERICAN

Section 11 requires the Administrator to acquire goods and services from domestic firms unless certain exceptions are met.

SECTION 12—AMENDMENTS TO THE NATIONAL AERONAUTICS AND SPACE ACT OF 1958

Section 12 amends The Act to encourage the use of commercially provided space goods and services that are acquired on a commercially reasonable basis.

SECTION 13—COMMERCIAL SPACE LAUNCH ACT AUTHORIZATION

Section 13 authorizes the appropriation of $4,392,000 to the Department of Transportation Office of Commercial Space Transportation for fiscal year 1990.

SECTION 14—NATIONAL SPACE COUNCIL

Section 14 authorizes $1,200,000 to carry out the activities of the National Space Council and amends the NASA Authorization Act, Fiscal Year 1989 to provide for up to six individuals to be compensated at a grade of level VI of the Senior Executive Service.

SECTION 15—INTERNATIONAL SPACE YEAR

Section 15 encourages the President to develop an International Space Year agenda and to declare a World Space Congress to be convened in 1992.

SECTION 16—ADVANCED SOLID ROCKET MOTOR CONTINGENT LIABILITY

Section 16 provides the Administrator with the authority to provide contingent liability in the event that the Government terminates for convenience the Advanced Solid Rocket Motor program and requires the submission of annual reports on four subjects.

SECTION 17—SPACE SHUTTLE USE POLICY

Section 17 states that it is the policy of the United States to use the space shuttle for purposes that either require the presence of man or the unique capabilities of the space shuttle and limits secondary payloads on the space shuttle to payloads for research, development, demonstration, scientific, and commercial programs.

SECTION 18—FAIR PRICING AGREEMENT

Section 18 prohibits the launching of satellites manufactured in the United States on launch vehicles manufactured by the Soviet Union unless certain circumstances are met.

SECTION 19—EXPORT OF SATELLITES FOR LAUNCH BY THE PEOPLE'S REPUBLIC OF CHINA

Section 19 extends the suspension of all licenses for the export of satellites manufactured in the United States for launch on launch vehicles owned by the People's Republic of China unless either the President reports to Congress or it is in the best interest of the national security of the United States to do so.

SECTION 20—LIFE SCIENCES STRATEGIC PLAN

Section 20 directs the Administrator to undertake a detailed study of life science requirements and knowledge base.

SECTION 21—COMMISSION FOR INTERNATIONAL COOPERATION IN PLANETARY EXPLORATION

Section 21 establishes a Commission for International Cooperation in Planetary Exploration in order to develop an inventory of methods to enhance the exchange of information regarding lunar and planetary exploration.

SECTION 22—OFFICE OF SPACE COMMERCE

Section 22 establishes an Office of Space Commerce within the Department of Commerce.

SECTION 23—UPGRADING HISTORIC LANDMARK FACILITIES

Section 23 directs the Administrator to maintain, modify, upgrade, and expand agency facilities designated as National Historic Landmarks under the National Historic Preservation Act.

SECTION 24—NATIONAL AERO-SPACE PLANE PROGRAM

Section 24 establishes a joint program for the development and demonstration of a primarily air breathing single-stage-to-orbit and long range hypersonic cruise research flight vehicle by 1995.

COMMITTEE RECOMMENDATION

A quorum being present, on July 27, 1989 the Committee favorably reported the bill H.R. 1759 by voice vote and recommends its enactment.

CONGRESSIONAL BUDGET OFFICE COST ESTIMATE

Pursuant to section 403 of the Congressional Budget Act of 1974 and rule XI, clause 2(l)(3) of the Rules of the House of Representatives, the report of the Congressional Budget Office follows:

1. Bill number: H.R. 1759.

2. Bill title: National Aeronautics and Space Administration Multiyear Authorization Act of 1989.

3. Bill status: As ordered reported by the House Committee on Science, Space, and Technology, August 3, 1989.

4. Bill purpose: H.R. 1759 would provide a multiyear authorization of appropriations for certain National Aeronautics and Space Administration (NASA) programs, and an authorization for 1990 for other NASA programs, the Office of Commercial Space Transportation in the Department of Transportation, and the National Space Council in the Executive Office of the President. The bill would also authorize the establishment of an Office of Space Commerce in the Department of Commerce and a Commission for International Cooperation in Planetary Exploration.

H.R. 1759 would authorize appropriations of $1.6 billion for the Comet Rendezvous Asteroid Flyby (CRAF/Cassini mission, with the funds to be available for obligation on a phased, multiyear basis. The bill would also authorize 1992 appropriations of $3.5 billion for the Space Station Freedom. (Public Law 100–685, the National Aeronautics and Space Administration Authorization Act, Fiscal Year 1989, authorized appropriations for the space station for fiscal years 1990 and 1991 of $2.1 billion and $2.9 billion, respectively.) Other NASA research and development activities would be authorized at $3.8 billion for fiscal year 1990, $4.1 billion for 1991, and $4.2 billion for 1992.

Also receiving a multiyear authorization would be NASA's space flight, control, and data communications (SFCDC) program. For this program, the authorization levels would be $5.0 billion for 1990, $5.2 billion for 1991, and $5.6 billion for 1992.

H.R. 1759 would also authorize NASA to enter into private financing agreements, such as leases or contracts for the development of two facilities—a neutral buoyancy facility and a payload processing facility—if the Administrator certifies that such agreements are in the best interest of the United States. NASA would also be authorized to provide for the payment of contingent termination liability for these projects; this liability would be paid only if either of the private financing arrangements is terminated by NASA for the convenience of the U.S. government.

5. Estimated cost to the Federal Government:

[By fiscal year, in millions of dollars]

	1990	1991	1992	1993	1994
Authorization level:					
Specific	12,799	9,271	13,283		
Estimated	1			15	15
Portion applied to debt reduction	−174	−190	−160		
Net authorization	12,626	9,081	13,123	15	15

[By fiscal year, in millions of dollars]

	1990	1991	1992	1993	1994
Estimated outlays	7,200	8,769	11,309	5,604	1,332

The costs of this bill would be in budget functions 250, 400, and 800.

Basis of estimate: This estimate assumes that the full amounts authorized would be appropriated for each fiscal year, and that portions of the amount authorized for space flight, control, and data communications would be used to reduce outstanding debt associated with the tracking and data relay satellite program. For the CRAF/Cassini multiyear authorization, CBO estimates that $490 million would be available for obligation in 1990, $370 million in 1992, $640 million in 1993, and $100 million in 1994. The estimated authorization level shown for fiscal year 1990 in the table above would cover costs for the establishment of the Ofice of Space Commerce and the international commission. The estimated authorization level shown for fiscal years 1993 and 1994 represents the annual payments associated with the private financing arrangements authorized by this bill; these arrangements are discussed below. The estimated outlays are based on historical spending patterns. Detailed estimates are shown in the table below.

Private Financing arrangements.—CBO estimates that the annual payments associated with the private financing arrangements authorized by this bill would be around $15 million annually beginning in fiscal year 1993, assuming the availability of appropriations. As part of these agreements, NASA would be authorized to incur a contingent termination liability, requiring payments to the private parties if the government terminates the contracts for its convenience.

Estimating the cost to the government of these private financing arrangements is difficult because their status is uncertain. The estimate presented here is intended to illustrate the potential budget impact of the private financing arrangements authorized by this bill. The estimated authorization level is NASA's estimated annual payments associated with these agreements. This estimate is based on assumptions that NASA would obtain a 10-year lease-purchase agreement for these facilities with payments beginning in 1993, and that NASA would not be the sole user of the facilities. This estimate assumes a total cost of the facilities of about $114 million.

ESTIMATED BUDGET IMPACT OF H.R. 1759

[By fiscal year, in millions of dollars]

	1990	1991	1992	1993	1994
NASA programs:					
Research and development (including CRAF/Cassini):					
Authorization level	5,407	4,068	7,702	.....	.....
Estimated outlays	2,149	3,611	5,954	3,831	987
Space flight, control, and data communications:					
Authorization level	5,014	5,194	5,572	.....	.....

ESTIMATED BUDGET IMPACT OF H.R. 1759—Continued

[By fiscal year, in millions of dollars]

	1990	1991	1992	1993	1994
Portion applied to debt reduction	−174	−190	−160	.....	.....
Net authorization	4,840	5,004	5,412	.....	.....
Estimated outlays	3,276	4,670	5,271	1,724	314
Construction of facilities:					
Authorization level	332	.....	.....	.....	.....
Estimated outlays	22	186	75	33	16
Research and program management:					
Authorization level	2,032	.....	.....	.....	.....
Estimated outlays	1,740	292	.....	.....	.....
Private financing arrangements:					
Estimated authorization level	.....	.....	.....	15	15
Estimated outlays	.....	.....	.....	15	15
Inspector general:					
Authorization Level	9	9	9	.....	.....
Estimated outlays	8	9	9	1	.....
Subtotal, NASA:					
Authorization level	12,794	9,271	13,283	15	15
Portion applied to debt reduction	−174	−190	−160	.....	.....
Net authorization	12,620	9,081	13,123	15	15
Estimated outlays	7,195	8,768	11,309	5,604	1,332
Other programs:					
Estimated authorization level	6	.....	.....	.....	.....
Estimated outlays	5	1	.....	.....	.....
Bill total:					
Authorization level	12,800	9,271	13,283	15	15
Portion applied to debt reduction	−174	−190	−160	.....	.....
Net authorization	12,626	9,081	13,123	15	15
Estimated outlays	7,200	8,769	11,309	5,604	1,332

Use of these private financing arrangements is generally more expensive than normal Treasury-financed appropriations because private developers must borrow money at interest rates that are higher than the government's cost of borrowing. In preliminary analyses presented earlier this year, NASA showed that private demand accounting for 20 percent of the use of these facilities would be sufficient to generate a net cost savings on these projects. CBO cannot predict the amount of private demand.

Contingent Termination Liability.—If these agreements are entered into, and if, as is likely, they specify termination payments, NASA could not withdraw from any of them without providing for the payment of contingent termination liability. The contingent termination liability would secure the private party's investment should the government choose to terminate either agreement for its convenience. Under H.R. 1759, NASA would be authorized to make this payment from any available unobligated balances. Nevertheless, we do not expect NASA to terminate either agreement for the convenience of the government, and, therefore, we expect that it would never need to make a termination liability payment.

The amount of contingent liability incurred by the government at any time would be the amount required to pay off any contractual commitments outstanding at that time. Because NASA is still

in the process of negotiating these arrangements, these amounts cannot be determined precisely at this time. Based on the estimated total cost of these arrangements, CBO estimates that the maximum contingent termination liability incurred by NASA would be less than $150 million.

6. Estimated cost to state and local governments: None.

7. Estimate comparison: None.

8. Previous CBO estimate: On August 18, 1989, the Congressional Budget Office prepared a cost estimate for H.R. 1759, as ordered reported by the Committee on Science, Space, and Technology. This estimate supersedes that previous one and incorporates committee amendments that were not reflected in the August 18 version.

9. Estimate prepared by: Michael Sieverts.

10. Estimate approved by: Robert A. Sunshine, for James L. Blum, Assistant Director for Budget Analysis.

EFFECTS OF LEGISLATION ON INFLATION

In accordance with rule XI, clause 2(l)(4) of the Rule of the House of Representatives, this legislation is assessed to have no adverse long-run inflationary effects on prices and cost in the operation of the national economy. NASA expenditures are labor intensive, with approximately 80 percent of spending directly for jobs and the remainder for materials. In fisal year 1990, NASA will employ 23,700 civil servants and support about 212,000 contractor and support services employees. Assuming a multiplier effect of 2.5, the total short-run employment effect on the United States economy in fiscal year 1990 is about 588,000 jobs. This represents less than one-half of one percent of the total civilian labor force in the United States—too small to have a significant national effect. There could, however, be some specific cases of industrial and regional employment and price changes influenced by NASA expenditures.

The most significant economic effects on NASA spending is the long-term productivity advance from new technologies developed for the space and aeronautics program. Many NASA-sponsored advances in air and space transportation, communications satellites, remote sensing satellites, and other innovations have improved the productive capacity of industry and stimulated the development and growth of many new businesses.

CHANGES IN EXISTING LAW MADE BY THE BILL, AS REPORTED

In compliance with clause 3 of Rule XIII of the Rules of the House of Representatives, changes in existing law made by the bill, as reported, are shown as follows (existing law proposed to be omitted is enclosed in black brackets, new matter is printed in italic, existing law in which no change is proposed is shown in roman):

NATIONAL AERONAUTICS AND SPACE ACT OF 1958

* * * * * * *

TITLE II—COORDINATION OF AERONAUTICAL AND SPACE ACTIVITIES

* * * * * * *

FUNCTIONS OF THE ADMINISTRATION

SEC. 203. (a) The Administration, in order to carry out the purpose of this Act, shall—

(1) plan, direct, and conduct aeronautical and space activities;

(2) arrange for participation by the scientific community in planning scientific measurements and observations to be made through use of aeronautical and space vehicles, and conduct or arrange for the conduct of such measurements and observations; [and]

(3) provide for the widest practicable and appropriate dissemination of information concerning its activities and the results thereof[.] ;

(4) seek and encourage, to the maximum extent possible, the fullest commercial use of space; and

(5) encourage and provide for Federal Government use of commercially provided space services and hardware, consistent with the requirements of the Federal Government.

* * * * * * *

(c) In the performance of its functions the Administration is authorized—

(1) * * *

* * * * * * *

(13)(A) to consider, ascertain, adjust, determine, settle, and pay, on behalf of the United States, in full satisfaction thereof, any claim for $25,000 or less against the United States for bodily injury, death, or damage to or loss of real or personal property resulting from the conduct of the Administration's functions as specified in subsection (a) of this section, where such claim is presented to the Administration in writing within two years after the accident or incident out of which the claim arises; and

(B) if the Administration considers that a claim in excess of $5,000 is meritorious and would otherwise be covered by this paragraph, to report the facts and circumstances thereof to the Congress for its consideration; [and]

(14) to reimburse, to the extent determined by the Administrator or his designee to be fair and reasonable, the owners and tenants of land and interests in land acquired on or after November 1, 1961, by the United States for use by the Administration by purchase, condemnation, or otherwise for expenses and losses and damages incurred by such owners and tenants as a direct result of moving themselves, their families, and their possessions because of said acquisition. Such reimbursement shall be in addition to, but not in duplication of, any payments that may otherwise be authorized by law to be made to such owners and tenants. The total of any such reimbursement to any owner or tenant shall in no event exceed 25 per centum

of the fair value, as determined by the Administrator, of the parcel of land or interest in land to which the reimbursement is related. No payment under this paragraph shall be made unless application therefor, supported by an itemized statement of the expenses, losses, and damages incurred, is submitted to the Administrator within one year from (a) the date upon which the parcel of land or interest in land is to be vacated under agreement with the Government by the owner or tenant or pursuant to law, including but not limited to, an order of a court, or (b) the date upon which the parcel of land or interest in the land involved is vacated, whichever first occurs. The Administrator may perform any and all acts and make such rules and regulations as he deems necessary and proper for the purpose of carrying out this paragraph. All functions performed under this paragraph shall be exempt from the operation of the Act of June 11, 1946, as amended (5 U.S.C. 1001–1011), except as to the requirements of section 3 of said Act. Funds available to the Administration for the acquisition of real property or interests therein shall also be available for carrying out this paragraph[.] ;

(15) to establish procedures for the procurement on a commercially reasonable basis by the Administration, for itself or other Government agencies, of space launch hardware and services or other space hardware and space services provided by the private sector, on an annual or multiyear basis consistent with Federal Government requirements; and

(16) to seek and promote the commercial use of space by establishing procedures and developing appropriate agreement terms and conditions which facilitate commercial use of the Administration's facilities and services, consistent with Government needs, and associated commercial facilities and services.

* * * * * * *

TITLE III—MISCELLANEOUS

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UPGRADING HISTORIC LANDMARK FACILITIES

SEC. 312. The Administrator may take whatever actions are necessary to maintain, modify, upgrade, rehabilitate, and expand facilities designated as National Historic Landmarks under the National Historic Preservation Act without regard to sections 106 and 110(f) of such Act, unless the proposed actions would alter the basic purposes or elements which were the bases for such designation.

* * * * * * *

SECTION 24 OF THE COMMERCIAL SPACE LAUNCH ACT

AUTHORIZED APPROPRIATIONS

SEC. 24. There are authorized to be appropriated to the Secretary $4,000,000 for fiscal year 1985. There is authorized to be appropriated to the Secretary to carry out this Act $586,000 for fiscal year

1986. There is authorized to be appropriated to the Secretary to carry out this Act $4,548,000 for fiscal year 1988. There is authorized to be appropriated to the Secretary to carry out this Act $3,827,000 for fiscal year 1989. *There are authorized to be appropriated to the Secretary to carry out this Act $4,392,000 for fiscal year 1990.*

* * * * * * *

SECTION 501 OF THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ACT, FISCAL YEAR 1989

NATIONAL SPACE COUNCIL

SEC. 501. (a) Effective February 1, 1989, there is established in the Executive Office of the President the National Space Council, which shall be chaired by the Vice President.

(b) By March 1, 1989, the President shall submit to the Congress a report that outlines the composition and functions of the National Space Council.

(c) The Council may employ a staff of not more than seven persons, which is to be headed by a civilian executive secretary, who shall be appointed by the President.

(d) Not more than 6 individuals may be employed by the National Space Council without regard to any provision of law regulating the employment or compensation of persons in the Government service, at rates not to exceed the rate of pay for Level VI of the Senior Executive Schedule as provided pursuant to section 5382 of title 5, United States Code.

(e) The National Space Council may, for purposes of carrying out its functions, employ experts and consultants in accordance with section 3109 of title 5, United States Code, and may compensate individuals so employed for each day they are involved in a business of the National Space Council (including traveltime) at rates not in excess of the daily equivalent of the maximum rate of pay for grade GS–18 as provided pursuant to section 5332 of title 5, United States Code.

(f) There are authorized to be appropriated $1,200,000 to carry out the activities of the National Space Council for fiscal year 1990.

SECTION 5314 OF TITLE 5, UNITED STATES CODE

§ 5314. Positions at Level III

Level III of the Executive Schedule applies to the following positions, for which the annual rate of basic pay shall be the rate determined with respect to such level under chapter II of title 2, as adjusted by section 5318 of this title:

Solicitor General of the United States.

* * * * * * *

Executive Secretary, National Space Council.

* * * * * * *

OVERSIGHT FINDINGS AND RECOMMENDATIONS

Pursuant to rule XI, clause 2(l)(3) of the Rules of the House of Representatives, and under the authority of rule X, clause 2(b)(1) and clause 3(f), the committee has incorporated in the present bill and report its findings and recommendations resulting from the committee's oversight activities.

OVERSIGHT FINDINGS AND RECOMMENDATIONS OF THE COMMITTEE ON GOVERNMENT OPERATIONS

No findings or recommendations on oversight activity undertaken pursuant to rule X, clause 2(b)(2), and rule XI, clause 2(l)(3) of the Rules of the House of Representatives have been submitted by the Committee on Government Operations for inclusion in this report.

ADMINISTRATION RECOMMENDATIONS

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION,
OFFICE OF THE ADMINISTRATOR,
Washington, DC, March 20, 1989.

Hon. ROBERT A. ROE,
Chairman, Committee on Science, Space, and Technology, House of Representatives, Washington, DC.

DEAR MR. CHAIRMAN: Submitted herewith is a draft bill, "To authorize appropriations to the National Aeronautics and Space Administration for research and development; space flight, control and date communications; construction of facilities; and research and program management; and for other purposes," together with the sectional analysis thereof.

Section 4 of the Act of June 15, 1959, 73 Stat. 75 (42 U.S.C. 2460), provides that no appropriation may be made to the National Aeronautics and Space Administration unless previously authorized by legislation. It is a purpose of the enclosed bill to provide such requisite authorization in the amounts and for the purposes recommended in the President's budget plan for FY 1990. For the fiscal year the bill would authorize appropriations totaling $13,273,995,000, to be made to the National Aeronautics and Space Administration as follows;

(1) for "Research and development," amounts totaling $5,751,600,000;

(2) for "Space flight, control and data communications," $5,139,600,000;

(3) for "Construction of facilities," amounts totaling $341,800,000;

(4) for "Research and program management," $2,032,200,000; and

(5) for "Inspector General," $8,795,000.

In addition, the bill would authorize appropriations of $2,980,500,000 for FY 1991 and $3,494,400,000 for FY 1992 for Space Station Freedom.

The bill includes a number of other provisions including the following:

First, the language in subsection (2) of section 1(g) has been changed to that found in the "Research and program management" section of the NASA appropriations bill in order to clarify the authority and reconcile potential problems resulting from the differing formulations.

Second, there is a new section 2 which provides for multi-year authorizations for FY 1991 and FY 1992 for other than Space Station Freedom.

Third, we have included a new section 6 which was part of our FY 1989 bill but which as deleted by the Congress, which would

amend the Space Act to allow NASA to withhold, from public disclosure, information which is subject to export control.

Fourth, section 7 is a new section on inventions in space which will clarify the applicability of U.S. patent laws to activities in outer space.

Fifth, we have included a new section 8, Privately Financed Facility Projects, which would amend the National Aeronautics and Space Act, as amended, to provide the Administrator with the authority to provide for commercial investment in special purpose facility projects and contingent termination liability for same.

Finally, the last section of the draft bill, section 10, provides that the bill, upon enactment, may be cited as the "National Aeronautics and Space Administration Authorization Act, 1990," rather than "1989."

As you know, NASA has, over the past several years, needed to make changes, modifications, and upgrades to many of its facilities that have been designated as National Historic Landmarks. We have been working within the Administration to develop a Programmatic Agreement which would permit us to take needed facility actions in an efficient and timely fashion while accommodating historic preservation concerns. We believe we are close to obtaining such an agreement, so the enclosed bill does not contain language addressing this issue. However, if the expected agreement is not obtained expeditiously, we plan to transmit to you an amendment to our FY 1990 Authorization Act to accommodate our concerns.

Where required by section 102(2)(c) of the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4332(2)(C)), and the implementing regulations of the Council on Environmental Quality, environmental impact statements covering NASA installations and the programs to be funded pursuant to this bill have been or will be furnished to the House Committee on Science, Space and Technology as appropriate.

The Office of Management and Budget advises that there is no objection to the presentation of this proposal to Congress, and that its enactment would be in accordance with the program of the President.

Sincerely,

JAMES C. FLETCHER,
Administrator.

Two enclosures.

A BILL To authorize appropriations to the National Aeronautics and Space Administration for research and development, Space flight, control and data communications, construction of facilities, and research and program management, and for other purposes

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SEC. 1. That there is hereby authorized to be appropriated to the National Aeronautics and Space Administration to become available October 1, 1989:

(a) For "Research and development," for the following programs:

(1) Space Station Freedom, $2,050,200,000; further, for the Space Station Freedom, $2,980,500,000 to be available

for obligation October 1, 1990 and to remain available until September 30, 1992; and further, for the Space Station Freedom, $3,494,000,000 to be available for obligation on October 1, 1991 and to remain available until September 30, 1993; Provided, That for the Space Station Freedom revised baseline, the funds appropriated for U.S. program development will not exceed $13.0 billion in fiscal year 1984 terms, adjusted for inflation and commercial participation;

(2) Space transportation capability development, $639,000,000;

(3) Physics and astronomy, $894,500,000;

(4) Life sciences, $124,200,000;

(5) Planetary exploration, $396,900,000;

(6) Space applications, $579,700,000;

(7) Technology utilization, $22,700,000;

(8) Commercial use of space, $38,300,000;

(9) Aeronautical research and technology, $462,800,000;

(10) Transatmospheric research and technology, $127,000,000;

(11) Space research and technology, $338,100,000;

(12) Safety, reliability and quality assurance, $23,300,000;

(13) Tracking and data advanced systems, $19,900,000;

(14) University Space Science and Technology Academic Program, $35,000,000;

(b) For "Space flight, control and data communications," for the following programs:

(1) Space shuttle production and operational capability, $1,305,300,000;

(2) Space transportation operations, $2,732,200,000;

(3) Space and ground network, communications and data systems, $1,102,100,000;

(c) For "Construction of facilities," including land acquisition, as follows:

(1) Construction of addition for Space Systems Automated Integration and Assembly Facility, Johnson Space Center, $10,500,000;

(2) Construction of addition to Mission Control Center, Johnson Space Center, $17,800,000;

(3) Construction of addition to Simulator/Training Facility, Johnson Space Center, $3,800,000;

(4) Modifications for Expanded Solar Simulation, Johnson Space Center, $2,000,000;

(5) Modifications of Process Technology Facility for Space Station, Marshall Space Flight Center, $4,000,000;

(6) Replace Cooling Towers, Launch Complex 39 Utility Annex, Kennedy Space Center, $4,600,000;

(7) Replace Launch Complex 39, Pad A Chillers and Controls, Kennedy Space Center, $1,200,000;

(8) Replace Roofs, Launch Complex 39, Kennedy Space Center, $11,000,000;

(9) Replace Vehicle Assembly Building Air Handling Units, Kennedy Space Center, $1,800,000;

(10) Upgrade Orbiter Modification and Refurbishment Facility to Orbiter Processing Facility, #3, Kennedy Space Center, $26,000,000;

(11) Modification of High Pressure Industrial Water System, Stennis Space Center, $2,000,000;

(12) Replacement of High Pressure Gas Storage Vessels, Stennis Space Center, $3,000,000;

(13) Construction of natural resource protection at various locations, $3,800,000;

(14) Refurbish bridges, Merritt Island, Kennedy Space Center, $4,500,000;

(15) Rehabilitation of Spacecraft Assembly and Encapsulation Facility II, Kennedy Space Center, $3,500,000;

(16) Rehabilitation of Central Heating/Cooling Plant, Johnson Space Center, $2,800,000;

(17) Construction of Data Operations Facility, Goddard Space Flight Center, $12,000,000;

(18) Construction of Quality Assurance and Detector Development Laboratory, Goddard Space Flight Center, $7,500,000;

(19) Modernization of South Utility Systems, Jet Propulsion Laboratory, $5,400,000;

(20) Construction of 40 × 80 Drive Motor Roof, Ames Research Center, $1,000,000;

(21) Modifications to Thermo-Physics Facilities, Ames Research Center, $4,600,000;

(22) Modifications to 14 × 22 Subsonic Wind Tunnel, Langley Research Center, $1,000,000;

(23) Modifications to National Transonic Facility for Productivity, Langley Research Center, $7,600,000;

(24) Modifications to 20-Foot Vertical Spin Tunnel, Langley Research Center, $1,900,000;

(25) Rehabilitation of Central Air Systems, Lewis Research Center, $2,400,000;

(26) Rehabilitation of Central Refrigeration Equipment, Lewis Research Center, $7,200,000;

(27) Rehabilitation of 8 x 6 Supersonic and 9 x 15 Low-Speed Wind Tunnels, Lewis Research Center, $6,800,000;

(28) Rehabilitation of Hypersonic Tunnel, Plum Brook, $4,100,000;

(29) Repair and Modernization of the 12-Foot Pressure Wind Tunnel, Ames Research Center, $27,600,000;

(30) Construction of Automation Sciences Research Facility, Ames Research Center, $10,600,000;

(31) Construction of Supersonic/Hypersonic Low Disturbance Tunnel, Langley Research Center, $6,900,000;

(32) Modifications for Seismic Safety, Goldstone, CA, Jet Propulsion Laboratory, $2,600,000;

(33) Repair of facilities at various locations, not in excess of $750,000 per project, $28,000,000;

(34) Rehabilitation and modification of facilities at various locations, not in excess of $750,000 per project, $36,000,000;

(35) Minor construction of new facilities and additions to existing facilities at various locations, not in excess of $500,000 per project, $10,000,000;

(36) Environmental compliance and restoration, $30,000,000;

(37) Facility planning and design not otherwise provided for, $26,300,000;

(d) For "Research and program management," $2,032,200,000;

(e) For "Inspector General," $8,795,000;

(f) Notwithstanding the provisions of subsection 1(i), appropriations hereby authorized for "Research and development" and "Space flight, control and data communications" may be used (1) for any items of a capital nature (other than acquisition of land) which may be required at locations other than installations of the Administration for the performance of research and development contracts, and (2) for grants to nonprofit institutions of higher education, or to nonprofit organizations whose primary purpose is the conduct of scientific research, for purchase or construction of additional research facilities; and title to such facilities shall be vested in the United States unless the Administrator determines that the national program of aeronautical and space activities will best be served by vesting title in any such grantee institution or organization. Each such grant shall be made under such conditions as the Administrator shall determine to be required to ensure that the United States will receive therefrom benefit adequate to justify the making of that grant. None of the funds appropriated for "Research and development" and "Space flight, control and data communications" pursuant to this Act may be used in accordance with this subsection for the construction of any major facility, the estimated cost of which, including collateral equipment, exceeds $500,000, unless the Administrator or the Administrator's designee has notified the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate, of the nature, location, and estimated cost of such facility.

(g) When so specified and to the extent provided in an appropriation act, (1) any amount appropriated for "Research and development," for "Space flight, control and data communications" or for "Construction of facilities" may remain available without fiscal year limitation, and (2) contracts may be entered into under "Research and program management" for maintenance and operation of facilities, and for other services to be provided during the next fiscal year.

(h) Appropriations made pursuant to subsection 1(d) may be used, but not to exceed $35,000, for scientific consultations or extraordinary expenses upon the approval or authority of the Administrator, and his determination shall be final and conclusive upon the accounting officers of the Government.

(i)(1) Funds appropriated pursuant to subsections (1) (a), (b), and (d) may be used for the construction of new facilities and additions to, repair, rehabilitation, or modification of existing

facilities, provided the cost of each such project, including collateral equipment, does not exceed $100,000.

(2) Funds appropriated pursuant to subsection (1)(a) and (b) may be used for unforeseen programmatic facility project needs, provided the cost of each such project, including collateral equipment, does not exceed $500,000.

(3) Funds appropriated pursuant to subsection (1)(d) may be used for repair, rehabilitation or modification of facilities controlled by the General Services Administration, provided the cost of each project, including collateral equipment, does not exceed $500,000.

MULTI-YEAR AUTHORIZATION

SEC. 2. There is authorized to be appropriated to the National Aeronautics and Space Administration, for other than Space Station Freedom, $11,654,700,000 for fiscal year 1991, and $12,176,500,000 for fiscal year 1992, for the purpose of carrying out the programs authorized in section 1 of this Act.

ADMINISTRATOR'S REPROGRAMMING AUTHORITY

SEC. 3. Authorization is hereby granted whereby any of the amounts prescribed in paragraphs (1) through (37), inclusive, of subsection 1(c)—

(a) in the discretion of the Administrator or the Administrator's designee, may be varied upward 10 percent, or

(b) following a report by the Administrator or the Administrator's designee to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate, on the circumstances of such action, may be varied upward 25 percent, to meet unusual cost variations.

The total cost of all work authorized under paragraphs (a) and (b) shall not exceed the total of the amounts specified in section (1)(c).

SPECIAL REPROGRAMMING AUTHORITY FOR CONSTRUCTION OF FACILITIES

SEC. 4. Where the Administrator determines that new developments or scientific or engineering changes in the national program of aeronautical and space activities have occurred; and that such changes require the use of additional funds for the purposes of construction, expansion, or modification of facilities at any location; and that deferral of such action until the enactment of the next authorization act would be inconsistent with the interest of the Nation in aeronautical and space activities; the Administrator may transfer not to exceed ½ of 1 percent of the funds appropriated pursuant to section (1)(a) and (1)(b) to the "Construction of facilities" appropriation for such purposes. The Administrator may also use up to $10,000,000 of the amounts authorized under section (1)(c) for such purposes. The funds so made available pursuant to this section may be expended to acquire, construct, convert, rehabilitate, or install permanent or temporary public works, including land acquisition, site reparation, appurtenances, utilities, and equipment. No such funds may be obligated until a period of 30

days has passed after the Administrator or the Administrator's designee has transmitted to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a written report describing the nature of the construction, its cost and the reasons therefore.

LIMITATIONS ON AUTHORITY

SEC. 5. Notwithstanding any other provision of this Act—

(a) no amount appropriated pursuant to this Act may be used for any program deleted by the Congress from requests as originally made to either the House Committee on Science, Space, and Technology or the Senate Committee on Commerce, Science, and Transportation;

(b) no amount appropriated pursuant to this Act may be used for any program in excess of the amount actually authorized for that particular program by subsections 1(a), 1(b) and 1(d);

(c) no amount appropriated pursuant to this Act may be used for any program which has not been presented to either such committee;

unless a period of 30 days has passed after the receipt by each such committee, of notice given by the Administrator or the Administrator's designee containing a full and complete statement of the action proposed to be taken and the facts and circumstances relied upon in support of such proposed action.

AMENDMENT TO SPACE ACT—WITHHOLDING OF TECHNICAL DATA

SEC. 6. Section 303 of the National Aeronautics and Space Act of 1958, as amended, is amended, by adding "(a)" after "303," by removing "and" before "(B)," and by adding after "national security" the following: ", and (C) information withheld under subsection (b) below." At the end of section 303(a), add the following new section:

"(b) Notwithstanding any other provision of law, the Administrator may prescribe regulations, in consultation with concerned agencies, under which the Administration is authorized to withhold, or to require the withholding, from public disclosure any technical data in the possession of, or under the control of, the Administration, if such data may not be exported lawfully outside the United States without an authorization or license under the Export Administration Act of 1979 (50 U.S.C. App. 2401-2420) or the Arms Export Control Act (22 U.S.C. 2751 et seq.). However, technical data may not be withheld under this section if regulations promulgated under either such Act authorize the export of such data pursuant to a general, unrestricted license in such regulations."

AMENDMENT TO SPACE ACT—INVENTIONS IN OUTER SPACE

SEC. 7(a). AMENDMENT.—Section 305 of the National Aeronautics and Space Act of 1958, as amended, is amended by adding at the end the following new subsection:

"(m) Any invention made, used or sold in outer space on an aeronautical and space vehicle (as defined in section 103(2)) under the jurisdiction or control of the United States shall be considered to

be made, used or sold within the United States for purposes of this Act, except with respect to any space vehicle or component thereof that is specifically identified and otherwise provided for by an international agreement to which the United States is a party."

(b) EFFECTIVE DATE.—

(1) IN GENERAL.—Subject to subsections (2), (3), and (4) of this section, the amendments made by section (a) shall apply to all United States patents granted before, on, or after the date of the enactment of this Act, and to all applications for United States patents pending on or filed on or after such date of enactment.

(2) AMENDMENTS NOT TO AFFECT PRIOR DECISIONS.—The amendments made by section (a) shall not affect any final decision made by a court or the Patent and Trademark Office before the date of the enactment of this Act with respect to a patent or an application for a patent, if no appeal from such decision is pending and the time for filing an appeal has expired.

(3) AMENDMENTS NOT TO AFFECT CERTAIN PENDING CASES.—The amendments made by section (a) shall not affect the right of any party in any case pending in a court on the date of the enactment of this Act to have the party's rights determined on the basis of the substantive law in effect before such date of enactment.

(4) AMENDMENTS TO BE PROSPECTIVE IN APPLICATION.—Subject to subsections (2) and (3) of this section, the amendments made by section (a) shall not apply to any process, machine, article of manufacture, or composition of matter, and embodiment of which was launched prior to the effective date of this Act.

AMENDMENT TO SPACE ACT—PRIVATELY FINANCED FACILITY PROJECTS

SEC. 8. The National Aeronautics and Space Act of 1958, as amended, is amended by adding the following new section:

"PRIVATELY FINANCED FACILITY PROJECTS

"SEC. 313. Notwithstanding the provisions of any other law, the Administration is authorized to enter into contracts, leases or agreements providing for private financing of special purpose facility projects, on government or nongovernment sites, for the exclusive or nonexclusive use of the Administration, its contractors or subcontractors: Provided, That such authorization may not be utilized unless the Administrator determines that such privately financed construction or modification is in the best interests of the Government: Provided further, That no project considered for private financing shall be initiated unless it has been submitted to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House of Representatives and Committees on Appropriations of the House of Representatives and of the Senate and 30 days have passed after the Administrator's notification of a proposed action hereunder: Provided further, That if, pursuant to the above stated provisions, the Administrator authorizes privately financed construction or modification, the Administration is authorized, not-

withstanding any provision of law to the contrary, to assume in the resultant contract, lease or agreement, contingent liability in excess of available appropriations relating to the Government's potential termination for its convenience of such contract, lease or agreement, if such contract, lease or agreement limits the amount of the payments that the Federal Government is allowed to make under such contract, lease or agreement to amounts to be provided in advance in appropriations Acts."

GEOGRAPHICAL DISTRIBUTION

SEC. 9. It is the sense of the Congress that it is in the national interest that consideration be given to geographical distribution of Federal research funds whenever feasible, and that the National Aeronautics and Space Administration should explore ways and means of distributing its research and development funds whenever feasible.

TITLE

SEC. 10. This Act may be cited as the "National Aeronautics and Space Administration Authorization Act, 1990."

SECTIONAL ANALYSIS OF THE BILL

To authorize appropriations to the National Aeronautics and Space Administration for research and development, space flight, control and data communications, construction of facilities, and research and program management, and for other purposes

SECTION 1

Subsections (a), (b), (c), (d), and (e), would authorize to be appropriated to the National Aeronautics and Space Administration, funds, in the total amount of $13,273,995,000, as follows: (a) for "Research and development," a total of 14 program line items aggregating the sum of $5,751,600,000; (b) for "Space flight, control and data communications," a total of 3 line items aggregating the sum of $5,139,600,000; (c) for "Construction of facilities," a total of 37 line items aggregating the sum of $341,800,000; (d) for "Research and program management," $2,032,200,000; and (e) for "Inspector General," $8,795,000.

Subsection 1(e) is a new appropriation account for the Inspector General.

Subsection 1(f) would authorize the use of appropriations for "Research and development" and "Space flight, control and data communications" without regard to the provisions of subsection 1(i) for: (1) items of a capital nature (other than the acquisition of land) required at locations other than NASA installations for the performance of research and development contracts; and (2) grants to nonprofit institutions of higher education, or to nonprofit organizations, whose primary purposes is the conduct of scientific research, for purchase or construction of additional research facilities. Title to such facilities shall be vested in the United States unless the Administrator determines that the national program of aeronautical and space activities will best be served by vesting title in any such grantee institution or organization. Moreover, each such grant

shall be made under such conditions as the Administrator shall find necessary to ensure that the United States will receive benefit therefrom adequate to justify the making of the grant.

In either case, no funds may be used for construction of a facility in accordance with this subsection, the estimated cost of which, including collateral equipment, exceed $500,000, unless the Administrator notifies the specified committees of the Congress, of the nature, location, and estimated cost of such facility.

Subsections 1(g) would provide that, when so specified and to the extent provided in an appropriation act, any amount appropriated for "Research and development," "Space flight, control and data communications," or for "Construction of facilities" may remain available without fiscal year limitation. Subsection (2) states that amounts appropriated for the "Research and program management" appropriation are available for contracts for maintenance and operation of facilities and for other services for this fiscal year and for the next fiscal year. This language has been changed to that found in the "Research and program management" section of the NASA appropriations bill in order to clarify the authority and reconcile potential problems resulting from the differing formulations.

Subsection 1(h) would authorize the use of not to exceed $35,000 of the "Research and program management" appropriation for scientific consultation or extraordinary expenses, including representation and official entertainment expenses, upon the authority of the Administrator, whose determination shall be final and conclusive.

Subsection 1(i)(1) would provide that of the funds appropriated for "Research and development," "Space flight, control and data communications," and "Research and program management," not in excees of $100,000 per project (including collateral equipment) may be used for construction of new facilities and additions to existing facilities, and for repair, rehabilitation, or modification of facilities.

Subsection (2) would provide that not to exceed $500,000 per project of "Research and development" and "Space flight, control and data communications" funds may be used for facility repair of modification due to unforeseen programmatic needs.

Subsection (3) would provide that not in excess of $500,000 per project (including collateral equipment) of funds appropriated for "Research and program management" may be used for work on facilities owned or leased by the General Services Administration.

SECTION 2—MULTI-YEAR AUTHORIZATION

Section 104 of Public Law 100-685, the National Aeronautics and Space Administration Authorization Act of 1989, provided that commencing in FY 1990 and every year thereafter, the President submits to Congress a 3-year budget request for NASA. This section authorizes appropriations for FY 1991 and FY 1992 in amounts necessary to carry out the President's FY 1990 budget for all programs other than Space Station Freedom. A three-year authorization of appropriations for Space Station Freedom is included in sec. 1(a) of this bill.

SECTION 3—ADMINISTRATOR'S REPROGRAMMING AUTHORITY

Section 3 would authorize upward variations of the sums authorized for the "Construction of facilities" line items of 10 percent at the discretion of the Administrator or the Administrator's designee, or of 25 percent following a report by the Administrator or the Administrator's designee to the Committee on Science, Space and Technology of the House of Representatives and the Committee on Commerce, Science and Transportation of the Senate on the circumstances of such action, for the purposes of meeting unusual cost variations. However, the total cost of all work authorized under these line items may not exceed the total sum authorized for "Construction of facilities" under subsection 1(c).

SECTION 4—SPECIAL REPROGRAMMING AUTHORITY FOR CONSTRUCTION OF FACILITIES

Section 4 would provide that no more than one-half of 1 percent of the funds appropriated for "Research and development" and "Space flight, control and data communications" may be transferred to and merged with the "Construction of facilities" appropriation, to be available for the construction of facilities and land acquisition at any location if the Administrator determines that new developments or scientific or engineering changes in the national aeronautical and space program have occurred; and that such changes require the use of additional funds for the purpose of construction, expansion or modification of facilities at any location; and that deferral of such action until the next authorization act is enacted would be inconsistent with the interest of the Nation in aeronautical and space activities. Additionally, up to $10,000,000 of "Construction of facilities" funds may be used for these purposes. However, no such funds may be obligated until 30 days have passed after the Administrator or the Administrator's designee has transmitted to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science and Transportation of the Senate a written report containing a description of the construction, its cost, and the reasons therefore.

SECTION 5—LIMITATIONS ON AUTHORITY

Section 5 would provide that, notwithstanding any other provision of this Act—

(a) no amount appropriated pursuant to this Act may be used for any program deleted by the Congress from requests as originally made to either the House Committee on Science, Space, and Technology or the Senate Committee on Commerce, Science and Transportation,

(b) no amount appropriated pursuant to this Act may be used for any program in excess of the amount actually authorized for that particular program by subsections 1(a), 1(b) and 1(d), and

(c) no amount appropriated pursuant to this Act may be used for any program which has not been presented to either such committee,

unless a period of 30 days has passed after the receipt by the House Committee on Science, Space and Technology and the Senate Committee on Commerce, Science and Transportation of notice given by the Administrator or the Administrator's designee containing a full and complete statement of the action proposed to be taken and the facts and circumstances relied upon in support of such proposed action.

SECTION 6—AMENDMENT TO SPACE ACT—WITHHOLDING OF TECHNICAL DATA

This section would amend the National Aeronautics and Space Act of 1958, as amended, to provide NASA the authority to withhold, or require the withholding, from public disclosure certain technical data that is subject to export control under the Export Administration Act of 1979 (50 U.S.C., App. 2401–2420) or the Arms Export Control Act (22 U.S.C. 2751 et seq.). The technical data subject to this amendment is only that data subject to those Acts and their implementing regulations and procedures. The amendment will provide NASA greater flexibility to manage high technology in its possession or under its control in a manner consistent with national policy regarding the export thereof. The amendment is similar to a provision amending the Freedom of Information Act (FOIA) originally contained in S. 774, the Freedom of Information Reform Act, as introduced in 1983 in the 98th Congress as well as to authority provided to the Department of Defense in section 1217 of the FY 1984 Defense Authorization Act (Public Law 98–84, 10 U.S.C. 140c).

As recognized by the Senate Judiciary Committee in its report (S. Rep. 98–221) accompanying S. 774, an anomaly exists between efforts to restrict the export of certain data important to the United States on the one hand, while allowing its public release under FOIA on the other. This anomaly comes about because nonproprietary technical data of the type that is subject to export control in the possession of any agency may also be subject to release under FOIA. Such release could be unrestricted and thereby obviate the requirement for an export license, or the release could even be to a foreign requester under FOIA. The purpose of this provision is to redress that anomaly.

In removing a similar provision from S. 774 by amendment on the Senate floor in 1984, Senator Orrin Hatch (sponsor of the bill and Chairman of the Judiciary Committee's Subcommittee on the Constitution, which had jurisdiction over the bill) noted that the DOD Authorization bill had been enacted (referring to Public Law 98–84) to address this problem area for the DOD, and then continued:

> There remain other areas with the potential of creating a problem, for instance, technical data with military or space application in the possession of NASA. In light of time constraints on this bill, it would be wisest to pursue other potential problem areas at another time. Accordingly, with a major part of the problem addressed by the proposed 10th exemption already enacted, it is the intent of

this amendment to defer other concerns in this technical data area until another time. C.R., Feb. 27, 1984, S. 1797.

This amendment will resolve the matter for NASA, as suggested by Senator Hatch.

In developing its implementing regulations under the proposed amendment, NASA will coordinate its efforts with other agencies (such as the Department of Defense) who have similar authority, as well as with the agencies that administer the export control laws, in an effort to achieve standardized procedures and uniform treatment for technical data subject to the withholding authority to the maximum extent practicable. Such coordination would include identifying categories of technical data that would require continuing interagency coordination prior to release. Also, NASA will assure that its implementing regulations exclude any technical data of another agency, a copy of which may be in the possession of NASA, consistent with present NASA policy set forth in 14 C.F.R. Part 1206. Rather, such data will be treated in accordance with whatever authority such other agency may have.

SECTION 7—AMENDMENT TO SPACE ACT—INVENTIONS IN OUTER SPACE

The purpose of this amendment is to provide clarity and certainty as to the applicability of U.S. patent laws to activities in outer space. This is important to commercial entities who need to know, with certainty, that their activities in space will receive the same patent protection that they would if conducted here on Earth. Removing that element of risk from the decision process of these companies will greatly increase the chances that they will proceed with their plans for activities in space.

This provision is intended to be consistent with U.S. international law obligations, including Article VIII of the Outer Space Treaty, which provides that "[a] State Party to the Treaty on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, and over any personnel thereof, while in outer space or on a celestial body." Thus, this provision should not be interpreted to apply to a foreign-registered space object unless there is a specific agreement with the registering State in this regard.

Another aspect is that it will provide flexibility in implementing agreements with foreign partners who will be cooperating with the United States in the development and use of the Space Station Freedom. This is possible by the exception to the strict application of U.S. patent law, for space vehicles that are specifically identified and otherwise provided for by an international agreement to which the United States is a party. Such an exception has been made, for example, regarding the applicability of 35 U.S.C. 184 (concerning filing of [patent] applications in foreign countries) in the international agreement for the Space Station Freedom.

The language of the proposed amendment is identical to that in H.R. 4316 which was passed by the House of Representatives on September 16, 1986, and H.R. 1510 which was passed by the House on October 5, 1988. Prior to such passage the bill was subject to hearings by the Subcommittee on Courts, Civil Liberties and the Administration of Justice, Committee on the Judiciary; and by the

Subcommittee on Space Science and Applications, Committee on Science, Space and Technology. It has also received substantial support from private industry and the private patent bar.

SECTION 8—PRIVATELY FINANCED FACILITY PROJECTS

The National Aeronautics and Space Administration (NASA) recognizes the importance of commercial investment and involvement in the construction and modification of facilities utilized in the United States civil space program. NASA, however, currently lacks the legal authority necessary to fully utilize these important tools. This amendment to the FY 1990 NASA Authorization Bill gives NASA that authority.

This amendment would amend the National Aeronautics and Space Act of 1958 (Public Law 85–568), as amended, providing permanent legislation which would allow NASA, notwithstanding any law to the contrary, to enter into contracts, leases or agreements providing for private financing of such special purpose facility projects, on government or on nongovernment sites, and for the exclusive or nonexclusive use of NASA, its contractors, or subcontractors whenever the Administrator of NASA determines that it is in the best interest of the Government to do so. The amendment would preclude the initiation of such privately financed facility projects until 30 calendar days had passed following the Administrator's notification to the authorizing and appropriation committees of proposed actions.

NASA also currently lacks legal authority to assume, in resultant contracts, leases or agreements, contingent termination liability in excess of available appropriations. Since it is highly improbable that private parties will provide financing for facility projects unless their investment in the projects are protected through Government assumption of contingent liability in the event they are terminated by the Government, it is necessary to the success of these privately financed facility projects that NASA be provided that authority. This amendment gives NASA the necessary authority.

SECTION 9—GEOGRAPHICAL DISTRIBUTION

Section 9 would express the sense of the Congress that it is in the national interest that consideration be given to geographical distribution of Federal research funds whenever feasible.

SECTION 10—TITLE

Section 10 would provide that the Act may be cited as the "National Aeronautics and Space Administration Authorization Act, 1990."

DOT REQUEST

THE SECRETARY OF TRANSPORTATION,
Washington, DC, March 24, 1989.

Hon. JIM WRIGHT,
Speaker of the House of Representatives,
Washington, DC.

DEAR MR. SPEAKER: The Department of Transportation is submitting for your consideration and appropriate reference a bill to authorize appropriations for fiscal years 1990 and 1991 for the Office of Commercial Space Transportation of the Department of Transportation, and for other purposes.

In the past year, the Office of Commercial Space Transportation (OCST) has confronted a number of significant challenges associated with its responsibility to facilitate and regulate the U.S. commercial launch industry. Firm establishment and healthy growth of this unique industry relates directly to a full range of critically important national interests—economic and technological well-being, as well as the national security. As just one example of the industry's importance, it is now classified as "a program for space within the definition of 'national defense' ", for purposes of the Defense Production Act and the availability of rocket fuel on a priority basis.

Also during the past year, OCST contributed to fashioning a fair approach to addressing one of the major issues associated with the industry's viability—the open-ended risks that commercial launch providers face. The solution, Public Law 100–657, was arrived at after close cooperation between the Executive and Legislative branches.

This legislation assumes OCST will set insurance requirements based on the actual risks associated with proposed launch activities. OCST has committed large portions of its past budgets to extensive research into space launch risks and hazards. The product of this research forms the basis for the risk-based approach to insurance requirements which is now reflected in the statute.

The Department seeks an authorization of $4,392,000 for continuation of all current activities and to meet the new challenges of heightened launch activity and emerging safety issues such as space debris, proposed commercial launch ranges, new launch concepts and the implementation of Public Law 100–657. As the Commercial Space Launch Manifest indicates, ten commercial launches are scheduled for FY 1990. OCST must also play an active role in the implementation of the commercial space launch services trade agreement recently reached with the Chinese.

The commercial space industry is a new, growing and rapidly changing industry. During the FY 1989 budget consideration, for example, it was not possible to forecast many of the critical issues on which OCST has expended resources. Examples of these issues are: ensuring that the commercial space launch sector receives its fair share of ammonium perchlorate and rayon fiber material, both key ingredients to rocket technology; trade deliberations with the Chinese; and assistance to Hawaii and Florida in development of commercial spaceports.

Consistent policy support during the past several years has had a twofold impact on this emerging industry. First, the companies which previously manufactured launch vehicles under government contract have been willing to take the risks and make the necessary investments to compete in a competitive environment which now exists on an international scale. Second, new companies are proposing new concepts for launch systems. If the United States is going to have a safe and vigorous private launch industry to meet the nation's needs in space, OCST must deal with these and other emerging issues in a time frame that will facilitate and not impede these exciting developments. Our requested authorization for FY 1990 will allow us to do the work, which remains critical to the growth of this important industry.

The appropriations authorizations in this legislative proposal are included in the residual freeze category of the President's FY 1990 budget plan. Final decisions concerning authorization levels in this category are to be determined through negotiations between the Administration and Congress. Accordingly, the authorization levels in this proposal, which as drafted reflects President Reagan's FY 1990 budget request, may need to be revised to reflect the results of such negotiations.

The Office of Management and Budget advises that there is no objection to the presentation of this proposal to Congress.

Sincerely,

SAMUEL K. SKINNER.

A BILL To authorize appropriations for the fiscal years 1990 and 1991 for the Office of Commercial Space Transportation of the Department of Transportation, and for other purposes

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That Section 24 of the Commercial Space Launch Act (49 U.S.C. 2623) is amended to read as follows:

"SEC. 24. There are authorized to be appropriated for the purpose of carrying out this Act $4,392,000 for fiscal year 1990 and such sums as are necessary for fiscal year 1991. Sums appropriated for research and development shall remain available until expended."

SECTION-BY-SECTION ANALYSIS

Section 1 of the bill would authorize appropriations for fiscal years 1990 and 1991 for the Department of Transportation's Office of Commercial Space Transportation programs. A total of $4,392,000 would be authorized for the activities of this Office in fiscal year 1990 and such sums as may be necessary for that purpose would be authorized for fiscal year 1991. Appropriations made for research and development would be available until expended, because these activities typically involve a series of contracts where one cannot begin until an earlier one is completed.

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